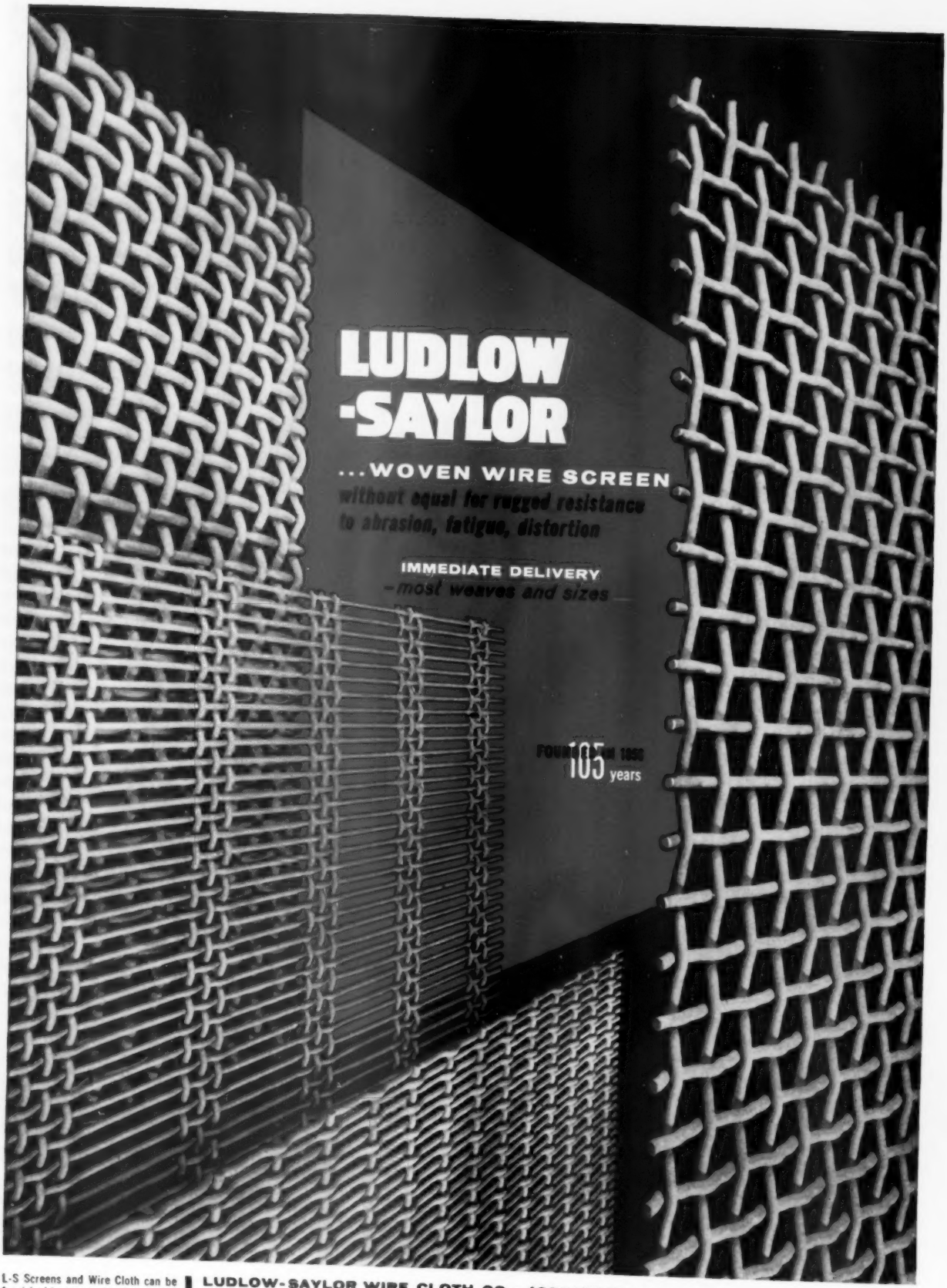
pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

DECEMBER 1961

CEMENT
SAND GRAVEL SLAG
CRUSHED STONE GYPSUM
LIME AGGREGATES FLINT
SILICA PHOSPHATE KYANITE
FLUORSPAR BORAX CINDERS
ASPHALT FELDSPAR PUMICE
SULPHUR PERLITE BAUXITE
NEPHELINE SYENITE QUARTZ
SCHIST ZEOLITE DOLOMITE
OCHER ASBESTOS EFROSITE
LEPIDOLITE ONYX ALUMINA
AGSTONE VERMICULITE
BERYL MARBLE SCORIA
KAOLIN SOAPSTONE
BRUCITE RIPRAP
REFRACTORIES
TERRAZZO
MICA

SEASON'S GREETINGS



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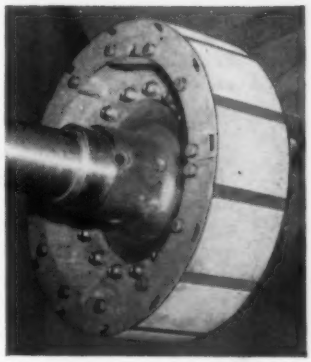
Enter Cover 2 on card, page 149

This Michigan Tractor Shovel operates on hillsides and 30° slopes ...get stopping power with Hi-Torque brakes

Working on a Springfield, Mass., reservoir job, the Fruin-Colnon Contracting Company and C & C Construction Co. use this 6 yard Tractor Shovel for clearing, stripping, excavating, lugging 16-ton pipe sections, backfilling, and other work. The contractor reports: "These operations call for good brakes which this machine has ... BFG Hi-Torques are tops!"

Hi-Torque brakes are now supplied as original equipment on a wide range of heavyweight vehicles: big dump trucks, tractor-scrapers, coal haulers, mine trucks, and other special vehicles. They provide up to 125,000 foot pounds of braking torque per brake in a smaller sized "package" than any other shoe brakes. Hi-Torque brakes cut stopping distance approximately in half, compared to conventional two-shoe brakes tested on identical vehicles and loads.

For information check your vehicle manufacturer, or write *B.F.Goodrich Aerospace and Defense Products, a division of The B.F.Goodrich Company, Dept.* **PQ-12,** *Troy, Ohio.*



Hi-Torque brakes give *full-circle contact* around the drum for maximum stopping power. Brakes can be operated by air-over-hydraulic, direct-hydraulic, or direct-high pressure air actuation.

B.F.Goodrich Hi-Torque brakes

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To all of the superior features of the KENNEDY Ball Tube Mill is now added the finest of mill drives.

This new KENNEDY Mill features:

A clean in-line drive arrangement—the first *practical, factory-sealed, symmetrical* drive—cuts field erection cost; shortens field erection time; Horsepowers up to 3300. Trunnion bearings of the most advanced design—self-aligning with water and oil-cooled non-scoring bronze alloy liners; sizes are generous for lowest bearing pressures.

Heavy duty mill shell—stress relieved after fabrication; flanges machined simultaneously.

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PIT and QUARRY

DECEMBER 1961
Vol. 54 No. 6

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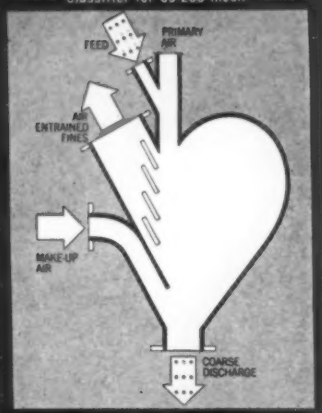

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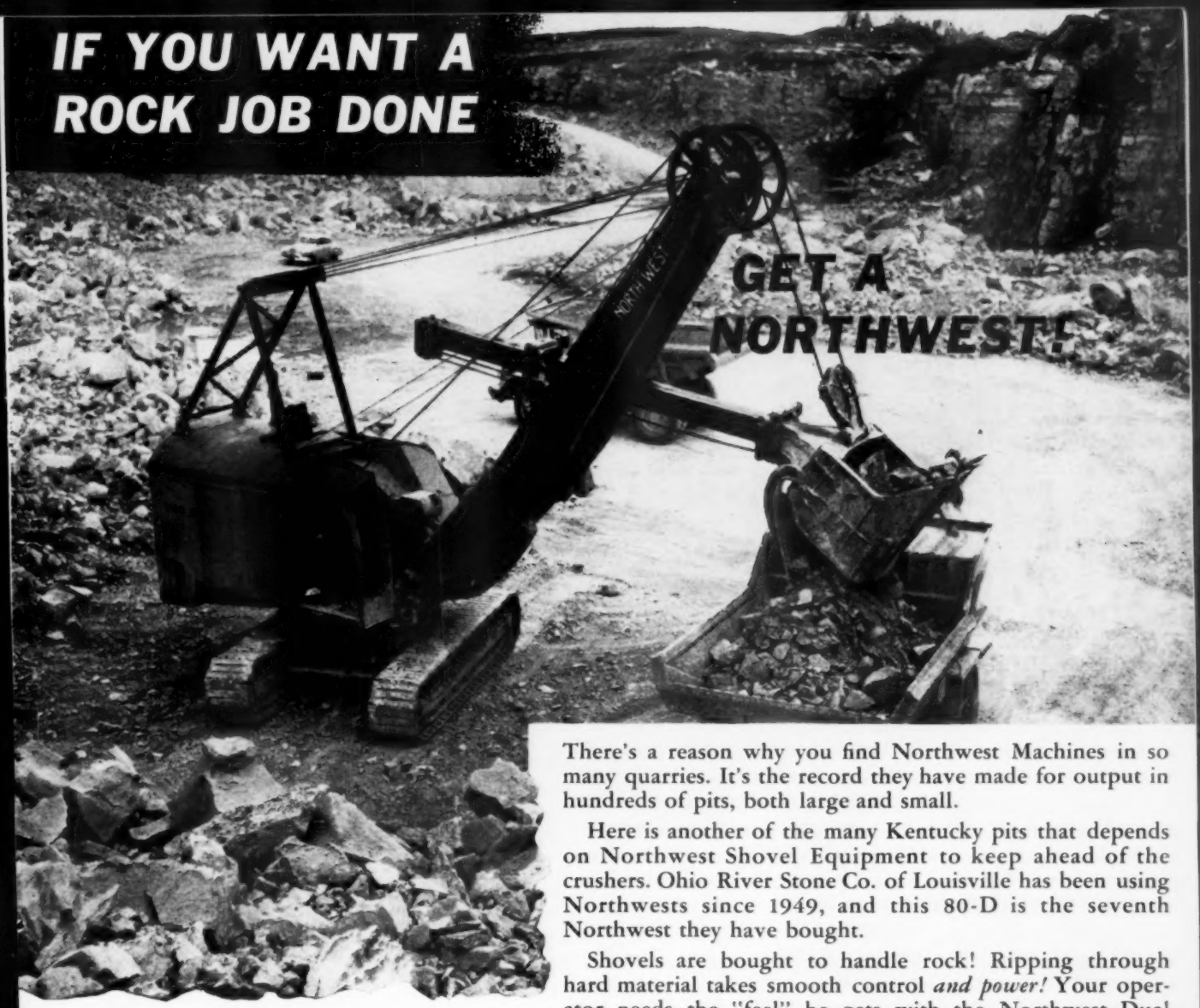
IF YOU WANT A ROCK JOB DONE



UNPOSED PHOTOGRAPH OF A NORTHWEST DOING A JOB

There's a reason why you find Northwest Machines in so many quarries. It's the record they have made for output in hundreds of pits, both large and small.

Here is another of the many Kentucky pits that depends on Northwest Shovel Equipment to keep ahead of the crushers. Ohio River Stone Co. of Louisville has been using Northwests since 1949, and this 80-D is the seventh Northwest they have bought.

Shovels are bought to handle rock! Ripping through hard material takes smooth control *and power!* Your operator needs the "feel" he gets with the Northwest Dual Crowd and the Feather-Touch Clutch Control. *Put him on a Northwest!* Give him the shovel that has *speed, power, endurance.* Give him the shovel with the Dual Independent Crowd that utilizes force most independent crowd shovels waste. Give him the smooth, fast swing that comes with the Northwest Uniform Pressure Swing Clutches.

Watch a Northwest at work—talk with Northwest owners. Keep posted on Northwest equipment. Let a Northwest man bring you up to date on the new Northwest features.

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Steet, Chicago 3, Illinois
1515 Field Bldg.

S-80-40-5

You can say... "THEY'RE ALWAYS READY TO GO!"

3/4 to 4 1/2
Cubic Yard Capacity

NORTHWEST

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity

PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	25-Ton and 45-Ton Capacity

Superintendents for Nello L. Teer Co.

tell what they think about Haulpak® truck performance

MR. J. H. AREY, superintendent at Nello Teer's Rocky Mount Quarry in North Carolina, enthusiastically reports, "After a month and a half of use, I can truthfully say I wouldn't part with these 27-ton LeTourneau-Westinghouse Haulpaks. The thing I like best about them is that there are *no* springs. The Hydrair® suspension makes it a much *easier riding* unit, and the Haulpak will turn around in a *much shorter space* than other trucks.

"Increase output 20%"

"The LW trucks are faster, too. In fact, the Haulpak will haul six loads in the same time other trucks haul only five. *This is about a 20% increase which is extremely good!*"

At Rocky Mount Quarry, Nello Teer's Haulpaks are used on stripping, hauling quarry rock, and for cleaning out silt settling basins, working with a dragline on the silt-removal operation.

Now read what Mr. E. L. Brantley, superintendent at Nello Teer Company's nearby Raleigh Quarry has to say about Haulpak performance on that operation.

"The features we like about Haulpak are their exceptionally good body design and strong, durable materials," says Mr. Brantley. "The body hoist is very smooth and fast acting. Haulpak's short-turn maneuverability saves a lot of time, too. And the power steering, power brakes, automatic transmission, plus Hydrair suspension makes it a pleasure for the drivers to haul material out of the quarry with Haulpaks.

"We have had an extremely small amount of maintenance on the Haulpaks. They're easy to work on. For example, you can change a Hydrair cylinder much easier than a spring.

"From our experiences so far, I can certainly recommend Haulpak to anyone . . . for any type of off-highway hauling operation!"

See for yourself how LeTourneau-Westinghouse Haulpak trucks will *increase your output, reduce your costs.* Five sizes, 22 to 65 tons, up to 600 hp. 90-ton bottom-dump also available. Ask for details.

HP-2458-GJ-2

LW

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILL.
A Subsidiary of Westinghouse Air Brake Company

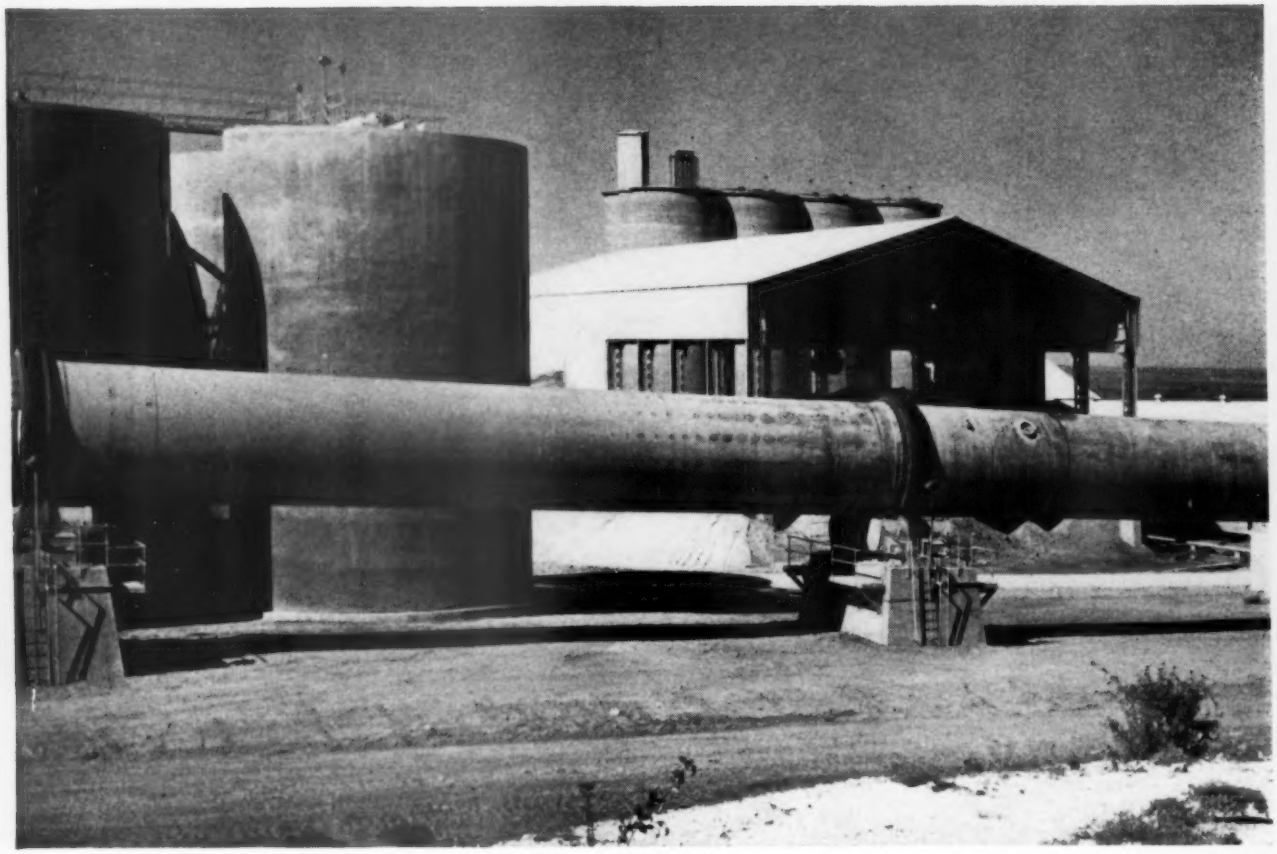
Where quality is a habit

Enter 6 on card, page 149

The six LW 27-ton Haulpak trucks owned by Nello L. Teer Co., Durham, N. C., are divided between the firm's Rocky Mount Quarry and its Raleigh Quarry operation. Here at the Raleigh Quarry, three LW trucks are hauling overburden about 1500 feet to dump. Crushed stone produced at the pits is used on Nello Teer's construction jobs, and is also sold to governmental agencies and local contractors.

New 4,000 BBL/Day Cement Plant

Integrates Fuller Equipment



Texas Industries of Dallas Achieves Unusually Low Capital Outlay And Operations Economy By Specifying Quality Equipment

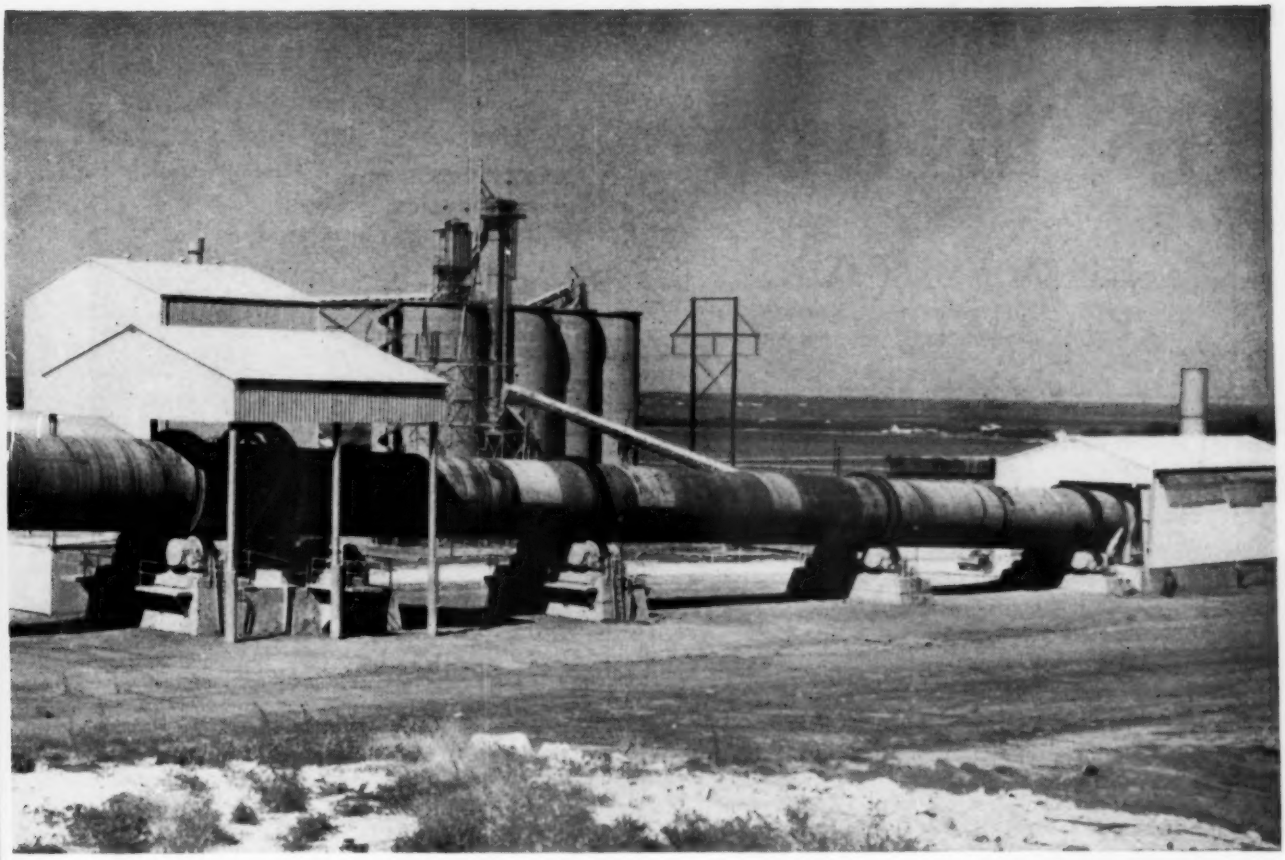
Designing on the basis that true economy in cement plant design considers operation and maintenance costs along with capital outlay, Texas Industries, Inc., with its consulting engineers, selected Fuller equipment for its new cement plant at Midlothian, Texas.

To meet specifications, the following major equipment items were integrated into this modern wet process plant: a Traylor 12 x 450 rotary kiln, a Fuller 8 x 44 horizontal grate cooler, a Traylor 1,500 HP raw mill and a 2,000 HP finish mill, in addition to Dracco multibag dust collectors, Fuller-Kinyon and Airslide fluidizing conveying systems, Fuller rotary compressors, Sutorbilt blowers, Lehigh induced draft fans, Fuller control panels, and auxiliary items.

Unified responsibility provided by Fuller helped to effect simplification of plant design and layout. The result: improved engineering liaison and procurement; significant savings in capital outlay and efficient operation.

Fuller's wide range of major cement plant components provides these advantages for leading cement producers. Behind the quality and systems compatibility of Fuller cement plant equipment is a coordinated research effort. The Fuller Research Department has made significant contributions to the industry. Investigate how Fuller unified responsibility and experience can mean substantial savings in capital costs and increased operational efficiency for you. 4184 G-249T

into Low Cost Design



FULLER EQUIPMENT AT TEXAS INDUSTRIES NEW PLANT

- Fuller-Kinyon Pneumatic Conveying Systems
- Fuller Airslide® Fluidizing Gravity Conveyors
- Fuller Control Panels
- Fuller Horizontal Cooler With Clinker Breaker
- Fuller Two-Stage Rotary Compressor
- Fuller Duplex Compressor
- Fuller Bin Signals
- Fuller Rotary Valves
- Fuller Rotary Feeders
- Fuller-Kinyon Diverting Valves
- Traylor Rotary Kiln 12 x 450
- Traylor Two-Compartment Raw Mill, 1,500 HP
- Traylor Two-Compartment Finish Mill, 2,000 HP
- Dracco Multi-Bag Dust Collectors
- Dracco Valves
- Sutorbilt Blowers
- Lehigh® Fans

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FULLER COMPANY • 100 BRIDGE ST. • CATASAUQUA, PA.
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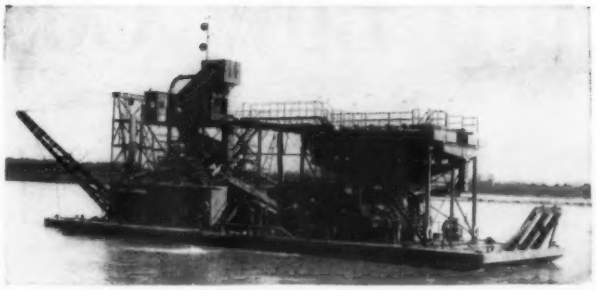
Three Years Later, This Operator Again—

—Tells Why He's CHANGED HIS MIND!



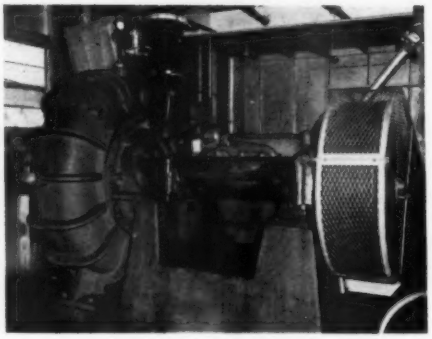
Federal Materials Company dredge at Paducah, Kentucky.

The FEDERAL MATERIALS Company

PLANTS
CAPE GIRARDEAU, MO. — PADUCAH, KY. — METROPOLIS, ILL.

PADUCAH, KENTUCKY

NOTE: Mr. Hely once thought our claims on performance of THOMAS DURABLE DREDGE PUMPS were "exaggerated". We are republishing his letter of July 17, 1958, showing why he changed his mind originally—then adding his current statement made after 3 years additional operation and showing why he still is highly pleased.



Thomas Durable Dredge Pump on Mr. Hely's dredge.

JULY 17, 1958

"Approximately one year ago we put in operation a complete new dredge for the production of sand and gravel for our Paducah, Kentucky plant.

"On this dredge we installed a Thomas Pump having 12" intake and 10" discharge. Our previous experience had been with various makes of dredge pumps. Prior to using a Thomas Pump, we thought some of the claims made by your sales personnel rather fabulous and exaggerated. After one year's use of the pump we know these claims to be unexaggerated and quite modest.

"The head on our new dredge is approximately 14 feet higher than any head we have previously pumped against. Our Thomas Pump is giving us much better production and more gallons per minute than we have ever experienced previously. We are easily averaging 300 tons per hour of specification sand.

"After one year's operation we have not lost one minute or had a moment's trouble with this pump. We have not dismantled the pump as our production at the present time is not noticeably different than the first month the pump was operated. We recently were required to replace a section of discharge pipe right over the pump and in replacing this we had a very good view of the impeller of this pump. We were very surprised that the wear was very negligible. From our past experience with dredge pumps, we know that any other pump we have used would in this length of time require the replacement of several thousand dollars in worn parts."

The FEDERAL MATERIALS COMPANY

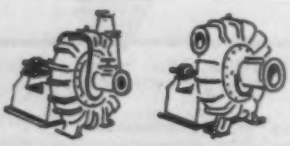
Norman L. Hely President

SEPTEMBER 27, 1961 (Three Years Later)

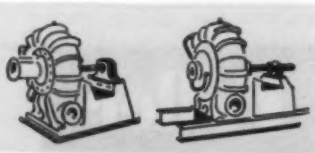
Mr. Hely made the following statement over the telephone today.

"We emphasize most emphatically the comments in our letter of July 17, 1958. We still are more than pleased with the performance of our Thomas Pump and the service rendered by Thomas Foundries."

Such performance is the result of using Thomas Ni-Hard and other modern alloys in the manufacture of Thomas Pumps. "YOU CANNOT BUY AT ANY PRICE A MORE DURABLE PUMP FOR SAND AND GRAVEL — YOU CANNOT BUY ANY OTHER PUMP THAT WILL MAKE YOU AS MUCH MONEY." Available in sizes 6" through 16".



THOMAS FOUNDRIES Inc.
P. O. BOX 1111, BIRMINGHAM, ALABAMA



Washington News Letter

By S. HERBERT UNTERBERGER

THE most important question engaging the attention of Washington officialdom is "What's on Khrushchev's mind?" The next most important is "What's causing the delay in economic recovery?"

With respect to the domestic economy, an increasing awareness is developing that the optimistic predictions of just a short while back are not being fulfilled. Instead of rising in the third quarter of 1961, industrial production may even have slipped a little in the beginning. First, the rapid rise in automobile production failed to materialize, principally because of strikes in one plant and then in another. The inevitable consequence was that less steel was used than expected, so that as the quarter wore on, instead of a rise in steel production, there was a cut-back.

The auto companies and the auto dealers are still optimistic about the 1962 model year. In the hope of stimulating sales, the auto firms began their model year somewhat earlier than usual. By now the season is several months old; and while a number of sales have been booked, delivery has been relatively slow.

Unfortunately for the industry's hopes, there is no evidence that American consumers are in an enthusiastic buying mood. To be sure, consumer income is higher than it has ever been before. To some extent, employment is rising, although not so rapidly as the Administration had expected.

But consumer spending is not rising as rapidly as either income or employment. Evidence of this is found in the fact that savings are rising and installment credit outstanding is falling instead of rising. For the most part this means that people are paying off what they owe on their old cars but not contracting much new debt for new ones.

The big "unknown" is what is happening to profits. Here the evidence is contradictory, and its interpretation is downright confusing. In its most recent report on national income and profits, the United States Department of Commerce reported a sharp rise in profits in the second quarter of 1961, observing, "As both volume and margins moved sharply upward in the spring quarter, corporate profits rebounded vigorously from the winter recession lows to $45.5 billion at seasonably adjusted annual rates."

On the basis of this finding, the Commerce Department made the following cautious but nevertheless specific prediction: "Information on corporate profits for the third quarter will not be available for some time, but a further rise in profits is indicated by recent increases in corporate sales. The profit gain is not likely to approach the second quarter $5 billion increase, which carried profits before taxes to a seasonably adjusted figure of $45 billion."

In an effort to anticipate the results of the official United States government figures, the economic unit of the weekly publication *U. S. News and World Report* compiled available profits data from more than 523 corporations and came up with the result that third quarter profits would show dramatic gains and would be likely to equal or exceed the previous high set in 1959. From these results it predicted even higher levels in 1962.

Unfortunately for this optimistic conclusion, a more recent tabulation made by the First National City Bank, which has been making profits surveys for many years, showed a contrary result. Instead of showing an increase in the net income of leading corporations for the third quarter, it showed a significant decline. Of special interest is the fact that this decline was more serious among manufacturing corporations than among those in nonmanufacturing industries, such as mining and quarrying, trade, etc. It is equally interesting that the net income for the first nine months of 1961 fell short of that shown in the first nine months of the previous year.

It is no wonder, therefore, that the interpretations of both of these private agencies, whose views are regarded highly in Washington, are quite different. While the former exudes optimism, the latter is very cautious, pointing out that, in its view, profit rates for this stage of the recovery are too low.

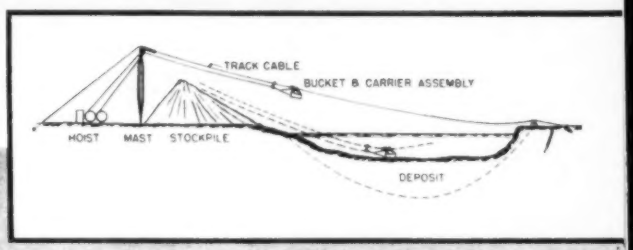
This opinion is based on the following analysis: "Since profits drop faster than economic activity in a recession, they need to rise more rapidly in periods of expansion. During recent cycles the recovery of profits has been incomplete. As a percentage of gross national product, corporate profits after taxes have declined from 5.8 percent in 1955 to 4.5 percent in 1960."

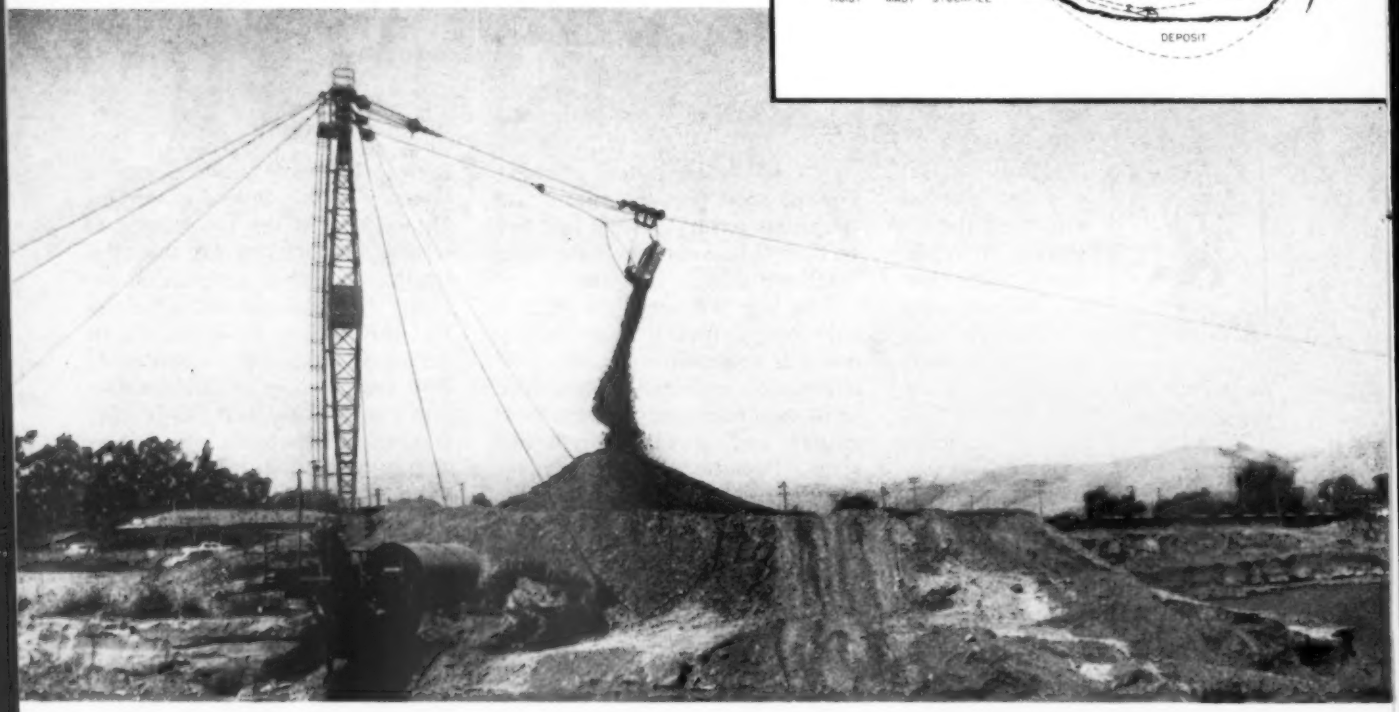
This uncertainty with regard to profit prospects has affected a number of the government's planning assumptions. If, in fact, profits do not rise as expected, the tax income of the Federal Government will fall even further short of expectations, and the budget will be far more seriously out of balance than was expected. Evidence that this fear has already been felt in high places is found in the President's recent order to government agencies, including the defense agencies, not to

(*Concluded on page* 72)

GET ALL THE MATERIAL OUT OF YOUR PIT

A Sauerman Slackline Will Recover It For 6 Cents A Ton





Plants Like This Are Turning Hard-To-Reach And Deep Materials Into Increased Profits

One way to beat increasing land values and depleting resources is to get all the material out of your present deposit. You can do this with a Sauerman Slackline Cableway. The machine starts at ground level and continues to work at depths and distances that cannot be reached with other excavating equipment. A Slackline will dig 100 feet below water and haul loads over 1000-ft. spans.

A Sauerman Slackline beats rising operating and labor costs, too. It provides what is probably the most economical of all excavating and hauling methods. Operating costs as low as 6 cents per ton for labor, power and maintenance are frequently reported.

Another advantage of the Sauerman Slackline is that it can be operated continuously in all types of weather. This permits building a ready stockpile to meet seasonal or unforseen demands.

If you are starting a new plant or updating an existing one, do it with the machine that gets the most out of your deposit at lowest possible cost. Sauerman Slacklines are built in sizes up to 3½ yds. to match your tonnage requirements. Write or call about your deposit. We'll recommend the proper machine.

Bucket inhauling load from 100-ft. depth.

SAUERMAN BROS., INC.

634 So. 28th Ave., Bellwood, Illinois
Linden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent DragScrapers • Slackline and Tautline Cableways • Durolite Blocks

Labor Developments

Lifetime Jobs

A RECENT agreement involving a small number of employees on the Southern Pacific Railroad is sending chills up the spines of employers not only in the railroad business but also in a number of other industries.

The Southern Pacific employs about 950 telegraph operators on a regular basis and has about 125 more on an "extra board" who fill in during the absence of the regular men. Recently these extra men have been receiving rather regular work covering for vacations and illnesses.

While their numbers are small, the telegraphers perform a function of critical importance. Without them, the railroad would be unable to operate. Accordingly, at the moment, their economic power is still great. However, it has been recognized for some time that new technologies have eliminated the need for a number of their jobs; and in the future many more, if not all of them, will be eliminated.

It is this fear of the future which led to the demand that all of these telegraphers be guaranteed their jobs until retirement. It should be pointed out that very few new telegraphers have been hired in recent years, and consequently many of those employed are not too far from the usual 65-year retirement age.

While the railroad did not agree to give everything which the telegraphers asked for, it did go a long way toward meeting the demand. The contract provided that no more than 20 telegraphers' jobs could be eliminated each year. Since more than this number die or retire each year, the net effect will be to provide regular jobs for the extra men and

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D.C.-Philadelphia, Pa.

perhaps even to require the hiring of new men.

If the jobs of any other regular telegraphers are abolished, they will continue to receive full pay until they retire. The railroad may transfer them to other jobs, but only to those under the jurisdiction of the Railroad Telegraphers Union, of which there are only very few.

Thus, for all practical purposes, they are guaranteed either their jobs or pay for the rest of their working lives. While most are expected to retire at age 65, there is nothing in the agreement requiring that. Many railroad employees do not retire at this first opportunity to obtain their full pensions but, rather, continue to work for at least a few years.

The extra men who now generally work all or most of every week will hereafter be guaranteed 40 hours' pay a week. As vacancies develop among the regular jobs, they will move into them and will then be covered by the lifetime guarantee. The only telegraphers who will not enjoy this guarantee will be employees newly hired after the effective date of this agreement. Even they, however, will be guaranteed a year's severance pay; or, if they continue to keep themselves available for work, lay-off pay may continue for as long as five years.

This is the strongest answer yet given to the threat of job losses through automation. It makes the meat packers' or longshoremen's arrangements for so-called automation funds to be used, to some extent, for the retraining of technologically displaced workers look like very small benefits, indeed.

How far this new employment benefit may spread is the question that is giving employers such anticipatory nightmares. They are especially apprehensive because of the approbation which this agreement achieved in highly placed government circles. Arthur J. Goldberg, Secretary of Labor, hailed it as a "landmark settlement of difficult issues." The chairman of the National Mediation Board, Francis A. O'Neill Jr., played an active role in arranging the settlement.

This agreement is dramatic evidence of the price which a small group of strategically placed unionized workers can command for their continued employment. It is unlikely that a union which represents all or most of a company's workers could achieve equal success. However, with this record before them, it would not be surprising if other similarly placed groups who are fearful of the effect of automation, should try to achieve the same goal.

New Look of the N.L.R.B.

New appointments made by President Kennedy to the National Labor Relations Board have changed —almost reversed—its outlook. Indeed, some observers are of the impression that it is the new Board's objective to review and reverse many of the decisions of the previous Eisenhower Board.

The beginning of this trend was seen in the early case in which the Board rescinded the previous ban on the "agency shop," an arrangement whereby nonmembers of the union are, nevertheless, required to pay the equivalent of dues as a service fee to the union which holds representation rights for their collective bargaining units.

Also, the belief that recent legislation protected employees against endless picketing has been dealt a cruel blow by two recent Labor

(Concluded on page 74)

"4-in-1 actions do 'most any job... Fast and Efficiently"

Supt. Wm. Hagedorn, George L. Rack, Inc., Cincinnati, Ohio

George L. Rack, Inc., produces washed sand for masonry, asphalt plants, and fill—also supplies top-soil and playground clay to various markets. Their International Drott TD-20 Four-in-One strips raw materials; loads out both raw and finished materials; builds and maintains pit roads; cleans-up around the washing plant.

"Our 4-in-1 gives us a single rig with unlimited versatility," states William Hagedorn, Plant Superintendent. "Four-in-One bucket actions enable the operator to do 'most any job, fast and efficiently. After our six years of 4-in-1 experience, we wouldn't even consider the other type of bucket."

Prove what it means to get mine-and-quarry-proved **loader, 'dozer, clamshell,** and **"carry-type scraper"** actions—all in one big-capacity rig. See your International Drott Distributor for a 4-in-1 demonstration.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

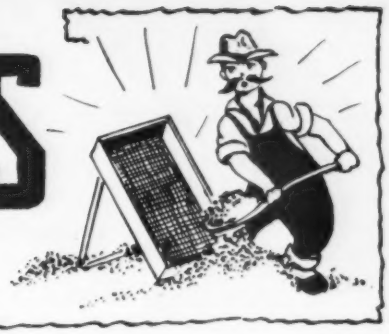
INTERNATIONAL® DROTT®

Clearing out a build-up of mucky, clay-type washing plant waste for easy loading and removal—note how the Rack company's operator uses clam back-drag action, pulls down the material fast, to speed work that "stumps" non-clam buckets!

Sticky, mucky materials that plug "lockjawed" buckets, waste time and run up costs, don't slow down the 4-in-1. Reason: exclusive, positive self-cleanout bottom dumping. Opening the clam pulls the material from bucket surfaces—gravity downpull does the rest and keeps the cycle rhythm!

For full-size, full-capacity bulldozer action, the operator simply "touch controls" the 4-in-1's front segment up—positions the blade segment—and rolls the earth like a specialized 'dozer!

SCREENINGS



By RAY L. SMITH JR.

HAPPY NEW YEAR! We hope that with the aid of thoughtful families and friends, Santa dumped his whole pack at your house! And we wish that the feeling of "peace on earth to men of good will" stays with you long after the first New Year's resolution is broken.

Anyway, old faults are forgiven at Christmas Time, old grudges forgotten. It seems easier then to like everybody—perhaps the influence of the One whose birthday we celebrate, even if His name is too seldom mentioned.

At least, that's our New Year wish for you—that all the good of Christmas may endure to bring you happiness 365 days, not just the one.

Paste this in your hat!

COME NEXT SPRING, the down-trodden taxpayer had better have a number on his "declaration of estimated tax."

If you don't think the age of regimentation, prison-style, has arrived, read on.

People with social security numbers will use these. People without will have to write in for a number. (Fortunately, the tax department boys do not yet require two mug shots with this number.)

Henceforth, you'll be just another number to Uncle Sam. To make sure this works, a penalty of five dollars will be imposed each time you forget the number.

When Congress hung this little ruling on your eye, it gave the Internal Revenue Service a full-nelson on every taxpayer.

Potpourri and Succotash

A commercial air lines pilot was engaged in conversation at the airport by a man who identified himself as a former World War II pilot with the Japanese air force.

"What's your name?" inquired the commercial pilot.

"My name is Chow Mein," said the former warrior.

"And you said you were a Kamikaze pilot? How could that be? You were supposed to have gone on a suicide mission."

"My name is Chicken Chow Mein."

A very shy young man sat next to a glamorous debutante at a dinner party. In the middle of the main course he seized a bowl of succotash and poured it over the debutante's chic coiffure. The young lady rose indignantly.

"How dare you?" she blazed, plucking corn and peas out of her hair. "How dare you throw succotash at me."

The young man blanched.

"Was that succotash? I thought it was spinach!"

The sales manager and his wife were sitting in the stands watching one of the early spring baseball games. The wind was raw and the rain was coming down in sheets. The woman turned to her husband and said: "This is probably another one of my silly questions, Dear, but why don't we just go home?"

The dilapidated old car wheezed up to the toll gate.

"Seventy cents," said the attendant.

"Sold," answered the driver wearily as he walked away.

"I'm sorry if our hammering disturbed you—we were hanging a picture."

"Oh, forget it. I just came over to ask you if it is okay if we hung a picture on the other end of the nail."

One of the first things one notices in a backward country is that the children still obey their parents.

The small daughter of a newly elected governor was very proud of her position and mentioned the fact at every opportunity.

"Darling," advised her mother, "you mustn't keep telling everybody that you're the daughter of the governor. Just tell them your name, that's all."

Later, while in the park, someone came over and asked, "Aren't you the governor's daughter?"

"Well," replied the child, "I thought I was, but Mother says not.

Mother of small boy to child psychiatrist: "Well, I don't know whether or not he feels insecure, but everybody else in the neighborhood certainly does."

Officer to recruit: "What were you in civilian life?"
Recruit: "Happy, sir."

Young man: "Do you enjoy Kipling?"
Girl friend: "I don't know. How do you kipple?"

Sign on a church in San Diego, California: "Trespassers will be forgiven."

A business tycoon was showing his daughter, just returned from finishing school, around the newly completed mansion. At the swimming pool they stopped to watch several athletic young men diving and stunting.

"Oh, Daddy," exclaimed the girl, "and you stocked it just for me!"

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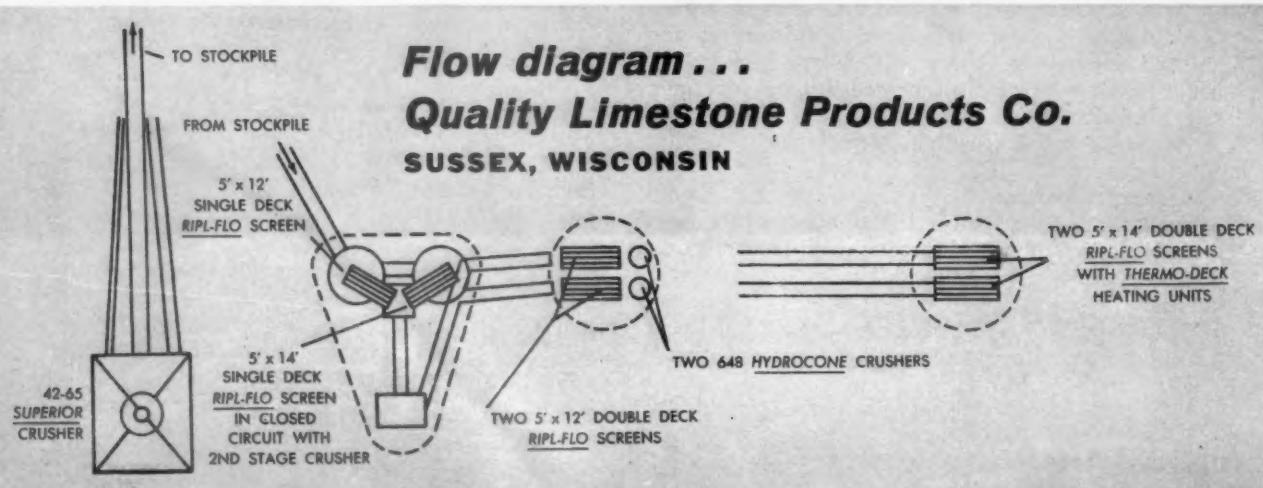
"Allis-Chalmers really


TO STOCKPILE
FROM STOCKPILE
5' x 12' SINGLE DECK RIPL-FLO SCREEN
5' x 14' SINGLE DECK RIPL-FLO SCREEN IN CLOSED CIRCUIT WITH 2ND STAGE CRUSHER
42-65 SUPERIOR CRUSHER
TWO 5' x 12' DOUBLE DECK RIPL-FLO SCREENS
TWO 648 HYDROCONE CRUSHERS
TWO 5' x 14' DOUBLE DECK RIPL-FLO SCREENS WITH THERMO-DECK HEATING UNITS

Flow diagram . . .
Quality Limestone Products Co.
SUSSEX, WISCONSIN

Quality Limestone Products Co. tells success story ... how Allis-Chalmers equipment and recommendations helped build business from a small beginning in 1948 to Wisconsin's largest crushed stone plant today. It is also a major producer of all types of building stone and agricultural limestone.

"It sure chews up the rock." That's how Mr. Lloyd Wolf — president of Quality Limestone Products Company, Sussex, Wisconsin — describes his new 600 tph *Superior* 42-65 gyratory crusher. The excellent performance of this rugged, dependable unit is no surprise to Mr. Wolf. He says, "We've used A-C crushers ever since we started in business—they've certainly helped us keep costs in line."

One of Quality's first crushers was a 48" *Hydrocone* crusher. It is still in use today, along with a newer 648 *Hydrocone* machine, for tertiary crushing. Both crushers are equipped with *Hydroset* control — an exclusive A-C feature that regulates product size instantaneously and automatically releases tramp iron.

"Allis-Chalmers," Mr. Wolf relates, "helped us right from the start. They showed us how to set up an efficient plant, and haven't stopped helping us since." One A-C recommendation was the addition of a surge pile after the primary crusher. This enables Quality to utilize machinery and manpower more efficiently.

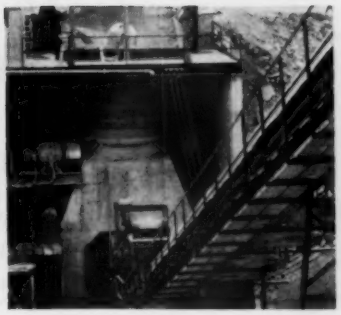
Mr. Wolf's plant is also equipped with A-C vibrating screens. He is pleased with their dependability and rugged construction.

The success story of Quality Limestone Products Company is typical among A-C customers. Perhaps we can help *you* achieve better profit and growth, too. Call in your A-C representative. Or write **Allis-Chalmers,** Milwaukee 1, Wisconsin. A-1541

Superior, Thermo-deck, Hydroset, Ripl-Flo and Hydrocone are Allis-Chalmers trademarks.

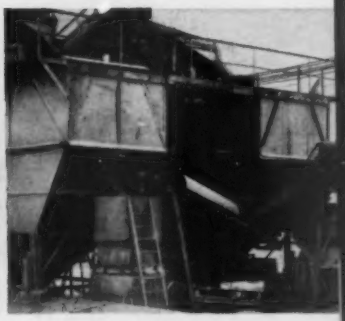
helped us grow!"

Overall view of quarry, showing surge pile at extreme right.



SUPERIOR primary crusher handles up to 600 tph of dolomitic limestone.

RIPL-FLO screens in closed circuit with second stage crusher.



HYDROCONE tertiary crushers with 2-deck RIPL-FLO screens.

ALLIS-CHALMERS

Enter 16 on card, page 149

US AT THE HEART OF INDUSTRY...

Live steam, inches away – yet this man's safe, next to the hose that death-causing steam cannot burst. U. S. Matchless® Steam Hose has its own built-in safety device. When it's ready for replacement, the wire-braid construction prevents it from bursting. Instead, just a wisp of steam seeps through, letting you know it's time for a new hose.
H 109

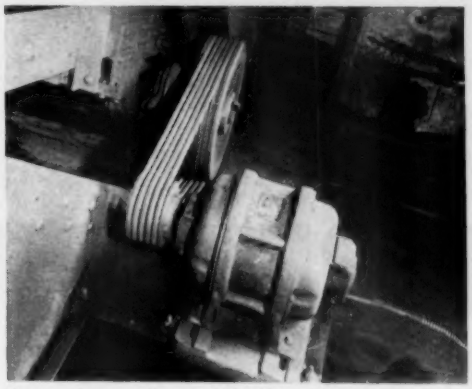
Mining and construction is rugged work, calling for products to match. And U.S. Rubber has long been known for the kind of rugged products that do more work, better, at less overall cost. That's why you'll see US products at the heart of mining and construction jobs everywhere.

Long after other hose have failed from the cuts, abrasion, and abuse of heavy-duty work, U. S. Matchless® Air Hose can be seen powering equipment at mining and construction sites everywhere. Its unique ability to withstand the toughest treatment is but one reason why U. S. Rubber is the largest producer of hose in the world, with a complete line of hose for every industrial need.

H 101

"On the job 3 times longer than belts previously used," says a co-owner of a Texas producer of foundry, chemical, and specialized sands about US HTB Elevator Belts. "We need belts that give long service at heats to 450°F, withstand terrific weight plus the abrasive action of sand. US Belts have never failed . . . never caused lost production or downtime."

CB 112



Known for maximum reliability, safety and profit, U.S. Royal V-Belts provide top efficiency, exceptional length stability, uniformity and long service life on all types of drives. You'll profit from the driving power of U. S. Royal V-Belts on conveyor, elevator, and loading-boom equipment; crushers, breakers, dryers and pumps; ventilator and cooling fans.

VB 109

For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U. S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U.S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

United States Rubber

MECHANICAL GOODS DIVISION

WERNER & SON, Clay Center, Nebraska. A Cat 966 with 4-yd. bucket feeds the 170-tons-per-hour blacktop plant and has plenty of time left to maintain the stockpiles. Operating ease and comfort play a big part in the 966 production. Ask operator Jim Jeffries. "Easy? I had to go back operating another machine the other day after running the 966. It's like running a Lincoln and then having to go back to a Model T. The power shift makes it easy and fast to operate on the job and the tight steering control makes it fast on the highway, too."

MORE OWNER-REPORTS

The sum total of most reports is this: Cat Wheel Loaders are setting new production records, lowering operating and maintenance costs, and letting operators finish a shift *without* being dead tired.

What are the reasons behind these good reports? Here are three of many:

Fast, powerful hydraulics. Time a Cat Wheel Loader's hydraulics—the lift, the quick drop. And watch it dig out of a bank. The speed and power come from a hydraulic system that has its pump driven *directly* from the engine; it's little affected by the load on the drive train. There's plenty of power available at all times and under all conditions.

Automatic bucket positioners. A third hand. Put the control lever in "lift" position and the bucket goes up automatically, then stops and holds at full height—while the operator is backing up and pulling up to truck or hopper.

WESTERN AGGREGATES, INC., La Canada, California, report their 944 with 2-yd. bucket averaged 3000 tons of material truck-loaded per eight-hour day over 40 weeks—plus stockpile maintenance. "It's more than just good production," they pointed out, "when you consider the low operating cost and no down time."

Fast cycles come easy for an operator on a Cat loader—exclusive automatic bucket controls, fast hydraulics and power shift transmission do it.

ON CAT LOADERS

After the load is dumped the lever is placed in "rack back" position and the automatic bucket positioner takes over again and tilts the bucket back to proper digging angle—and the operator is free to maneuver the loader.

Open deck design. The lift arms and cylinders are all up *forward*. Operators can push a Cat Wheel Loader hard, because they're not bothered by mechanisms raising and lowering beside them. They feel safer, more comfortable, more confident. They're safer getting on and off, too . . . easy steps from ground up to the big soft seat.

Try one of the three Cat Wheel Loaders on your job. Call your Caterpillar Dealer soon.

966—140 flywheel HP, 205 max. HP
944—105 flywheel HP, 135 max. HP
922—80 flywheel HP, 105 max. HP

Twenty buckets available from 1 yd. to 5 yd. including the Cat Side Dump Buckets.

CATERPILLAR

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Caterpillar Tractor Co., General Offices, Peoria, Illinois, U.S.A.

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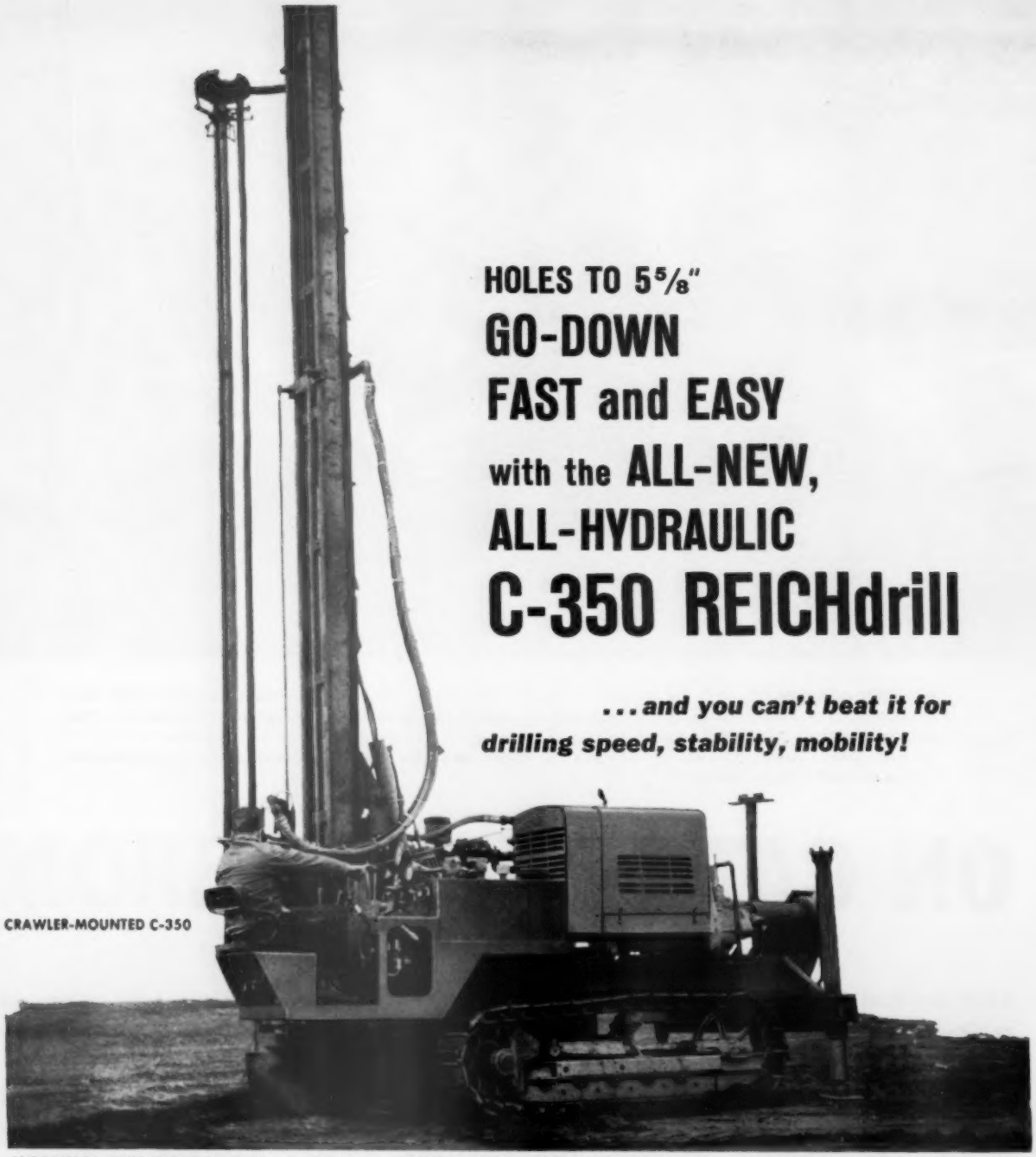


CRAWLER-MOUNTED C-350

HOLES TO 5⅝"
GO-DOWN FAST and EASY with the ALL-NEW, ALL-HYDRAULIC C-350 REICHdrill

...and you can't beat it for drilling speed, stability, mobility!

NOMINAL HOLE SIZE—1⅞" to 5⅝" • DOWN PRESSURE—10,000 LBS. • ROTARY SPEED to 540 RPM

Easy Operation is assured by all-hydraulic, labor-saving controls. *Stability* is provided by 14" wide tracks, low center of gravity and 8'8" wide frame plus 3 REICH heavy-duty hydraulic leveling jacks. *Mobility* is high because the crawler-mounted 350 trams at 7.8 MPH; climbs 25% grades, turns in its own length. *Versatility* is basic in REICHdrill design. The 350 is at home blastholing with 3-cone rotary bits, In-Hole Drills, or drag bits; and whether coring or prospecting.

A truck-mounted T-350 REICHdrill for greater mobility with all the above advantages, is also available. Get detailed specifications.

Ask for SP-5001-2

REICHdrill

FRANKLIN (VENANGO COUNTY), PENNA.

Division: CHICAGO PNEUMATIC TOOL CO.

News of the Industry

Southern Materials Co. Heads Aggregates Supply For Virginia Bridge Project

One of the most impressive construction projects on the eastern seaboard, the $200 million lower Chesapeake Bay bridge-tunnel complex, requires $10 million worth of aggregate and rock materials. A contract for supplying these materials was awarded to Southern Materials Company, Inc., Norfolk, Va.

All sand and gravel for concrete aggregate is being supplied by Southern Materials, which in turn negotiated contracts with three other firms in Virginia and one in North Carolina to supply crushed rock and riprap. These firms include W. E. Graham and Sons division, Vulcan Materials Company, Boydton, Va. (Greystone Quarry Division, Vulcan Materials, Henderson, N. C., delivers a part of the tonnage contracted by Vulcan); Trego Stone Corporation, Skippers, Va.; Tidewater Crushed Stone Company, Richmond, Va.; and Superior Stone Company, Roseville, N. C. Each of the foregoing five operations will supply one-fifth (about 366,000 tons) of the total tonnage of rock required.

More than 500,000 tons of sand and gravel are being produced from three deposits by Southern Materials, and a large part of this tonnage is being used in the Cape Charles plant of the Bayshore Concrete Products Corporation in the manufacture of bridge components.

Most of the rock used in the project is utilized in connection with the construction of four artificial islands that incorporate approaches to tunnels under two ship channels. Crushed materials and riprap will provide protective fill and covering for the steel tunnel sections and island perimeters.

The over-all project, including approach roads, totals approximately 22½ miles.

$18 Million Expansion Involving Two Plants Planned by Permanente

Permanente Cement Company officials have announced plans for an expansion program which will cost approximately $18 million. This project includes an addition to the Cushenbury plant and the construction of a new plant near Helena, Mont. Combined capacity of the two facilities will increase Permanente's annual cement production from 14.8 to 18.9 million barrels.

A new 2,700,000-bbl. kiln costing $8.8 million will be added to the Cushenbury plant in Lucerne Valley, San Bernardino County; it should be completed in 1962.

The $9.6 million plant near Helena, scheduled to begin operations in 1963, will produce 1,400,000 bbl. of cement.

Core drilling tests at the Helena site have shown that there is enough suitable limestone to last 100 years.

Coming Events

January 12-13, 1962 — Miami Beach. Annual meeting, The Expanded Clay and Shale Association. Deauville Hotel.

January 15-19, 1962 — Miami Beach. January meeting, National Limestone Institute, Inc. Roney Plaza Hotel.

January 28-February 1, 1962—Chicago. 43rd annual convention and exhibition, Associated Equipment Distributors. Conrad Hilton, Sheraton-Blackstone, and Pick-Congress hotels and Essex Inn.

February 5-9, 1962 — Chicago. 32nd annual convention and biennial show, National Sand and Gravel Association and National Ready Mixed Concrete Association. Conrad Hilton Hotel and McCormick Place.

February 12-14, 1962—Chicago. Annual convention and machinery exposition, National Crushed Stone Association. Conrad Hilton Hotel.

February 17-22, 1962—Las Vegas, Nev. Seventh annual convention, National Bituminous Concrete Association. Flamingo Hotel.

February 18-22, 1962 — New York. 91st annual meeting, American Institute of Mining, Metallurgical and Petroleum Engineers, Inc. Statler Hotel.

June 18-21, 1962—Washington, D. C. 17th annual convention, National Lime Institute, Inc. Statler-Hilton Hotel.

Construction Put in Place During October, 1961 Slightly Up From Oct., 1960

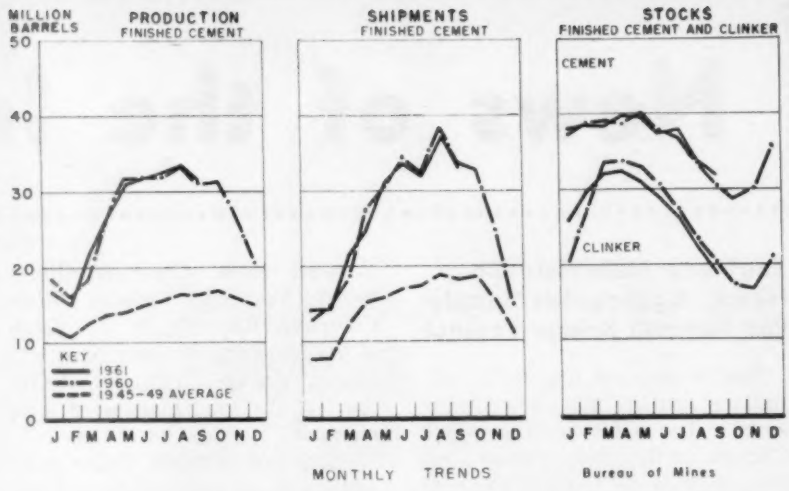
The value of total new construction put in place in October, 1961, amounted to $5.3 billion, according to preliminary estimates of the Bureau of the Census, U. S. Department of Commerce. This amount was 3 percent less than the revised estimate for September, 1961, approximately the normal decrease expected between September and October. Spending for total new construction in October, 1961, was 5 percent above October, 1960.

Private construction: Total new private construction expenditures in October, 1961, amounted to $3.7 billion, 2 percent less than the revised September, 1961, level, a decline slightly more than normally expected between September and October. The October, 1961, level was 6 percent above October, 1960.

Spending for construction of private nonfarm residential buildings in October, 1961, amounted to $2.1 billion, about 2 percent less than the revised September, 1961, estimate. This was about the normal seasonal change between September and October. Expenditures in October, 1961, were 9 percent greater than in October, 1960.

Public construction: Total new public construction expenditures in October, 1961, amounted to $1.6 billion, 5 percent less than the revised estimate for September, 1961 —approximately the normal expected change between September and October. Spending for public construction in October, 1961, was 5 percent above the level of expenditures in October, 1960.

Cumulative: Spending for total new construction in the first ten months of 1961 increased 3 percent to $47.5 billion, compared to $46.3 billion in the same period of 1960. The ten-month total of private construction expenditures increased slightly in 1961 to $33.4 billion, compared to $33.0 billion in 1960; however, spending for private residential construction declined 3 percent to $18.5 billion in 1961. During the same period, spending for total public construction increased 6 percent to $14.1 billion in 1961.



— September, 1961, Finished Portland Cement —

SUMMARY—Production of finished portland cement in September, 1961, as reported to the U. S. Bureau of Mines, totaled 31,474,000 barrels, an increase of 1 percent over that of September, 1960. Mill shipments in September, 1961, totaled 33,204,000 barrels, a decrease of 1 percent, compared with the total for September, 1960. Stocks of 31,774,000 barrels of finished portland cement were 4 percent more than those on hand September 30, 1960. Clinker production during September, 1961, totaled 28,296,000 barrels, an increase of 1 percent over that of September, 1960.

►PRODUCTION—A total of 174 plants in 39 states and Puerto Rico reported production of 31,474,000 barrels in September, 1961, compared with 31,181,000 barrels in September, 1960.

Clinker production in September, 1961, was 28,296,000 barrels, compared with 28,068,000 barrels in September, 1960.

High-early-strength portland cement in September, 1961, totaled 959,000 barrels, an increase of 17 percent over September, 1960.

Prepared masonry cement production in September, 1961, was 1,699,000 barrels, a decrease of 12 percent from September, 1960. (Masonry cements are reported in 280-lb. barrels.)

►SHIPMENTS—Mill shipments of finished portland cement in September, 1961, totaled 33,204,000 barrels, compared with 33,599,000 barrels in September, 1960.

In September, 1961, shipments were higher in 10 districts and lower in 13 districts than in September, 1960. The greatest increases were in the Puerto Rico, Georgia-Florida, Tennessee, and eastern Pennsylvania-Maryland districts.

Mill shipments of high-early-strength portland cement totaled 1,238,000 barrels, an increase of 6 percent from the 1,171,000 barrels shipped in September, 1960.

Shipments of prepared masonry cement in September, 1961, totaled 1,795,000 barrels, a decrease of 3 percent from the 1,842,000 barrels shipped in September, 1960.

►STOCKS—Mill stocks of 31,774,000 barrels of finished portland cement were on hand September 30, 1961, an increase of 4 percent over 30,505,000 barrels on September 30, 1960. Stocks of clinker on hand September 30, 1961, totaled 18,704,000 barrels, a decrease of 8 percent from 20,264,000 barrels on September 30, 1960.

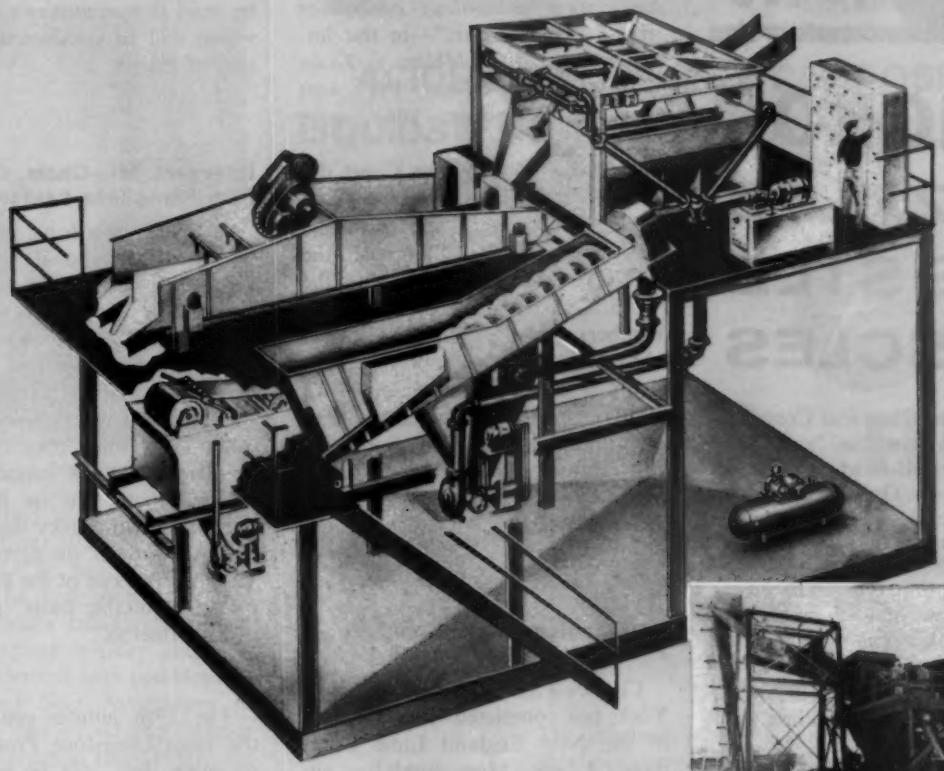
►FIRST NINE MONTHS OF 1961—For the January-September period, the production volume of finished cement amounted to 240,039,000 barrels, compared with 240,548,000 barrels in the 1960 nine-month period. Total shipments for the first nine months of 1961 are reported at 241,772,000 barrels; in the same period of 1960 total shipments were 239,254,000 barrels. (Shipment figures do not include finished cement used in the manufacture of prepared masonry cement, as follows: September, 1960—263,000 barrels; January-September, 1960—2,083,000 barrels; September, 1961—264,000 barrels; January-September, 1961—2,043,000 barrels.)

On October 3 ground was broken at Waukegan, Ill., for the Huron Portland Cement Company's distribution plant, which will serve Chicago, northern Illinois, and southern Wisconsin. It will have a storage capacity of 150,000 bbl.

The "Profit Puzzle" will be the theme of the Associated Equipment Distributor's 43rd annual meeting, to be held at the Conrad Hilton Hotel, Chicago, from January 28 to February 1, 1962. During a full week of activities centered upon four general sessions, approximately 3,500 delegates will hear distinguished speakers, who will focus on realistic objectives for the industry.

Our Christmas cover Santa Claus by courtesy of Austin Powder Co.

A NEW HIGH DEGREE OF DELETERIOUS MATERIAL REMOVED BY EAGLE HMS PLANTS!

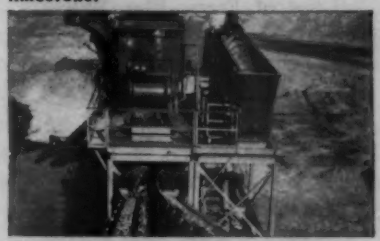


Eagle HMS Plants handle crushed stone as well as gravel—this unit is doing excellent job removing chert and porous limestone.

A STUDY of Eagle Heavy Media Separation Plants in use shows that they are providing remarkable separation of unwanted material of lighter specific gravity, retaining a higher percentage of sound usable stone.

THE secret is in the O.C.C. Separatory vessel, at top right in the drawing. The wanted material sinks to the rounded bottom of the vessel. A rubber-bladed hydraulic raking mechanism lifts the sink material over both sides into flumes to the rinsing screen. The lighter stone or gravel is held in suspension by the media until it is floated out onto a separate rinsing screen where the media is washed off and recovered for re-use. *Deleterious float material cannot recontaminate the sink material in this HMS plant, once the two are separated.*

Operation is surprisingly simple and economical. Plant capacities 25-tons and larger. If you have chert or soft stone problems *send for Eagle HMS data file.*



This Michigan producer readily meets premium material specs since installing an Eagle HMS Plant to handle natural gravel. Float material runs 9-10%.

Eagle HMS Plant solved chert and soft stone problem in crushed gravel for this aggregate plant thus gaining new customers.

SINCE 1872

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Factory-Trained Distributors Everywhere.

FLEX FACTS

THIOKOL MUZZLES MISSILE MUSCLES

Thiokol Chemical Corporation makes the "muscles" for missiles at the giant Longhorn Ordnance Works, Marshall, Texas. Keeping the latest in solid missile fuels from "blasting off" in production, yet controlling the flow of such hot stuff to motor cases, was the problem.

Thiokol's answer was Farris Flex Valves...providing full pipe capacity for hard to handle solids, along with quick and positive shut-off. Other factors influencing Thiokol's selection were the vibration-absorbing qualities of Farris Flex Valves and the absence of internal parts and obstructions to block the flow of dangerous materials.

Controlling the flow of hard to handle acids, abrasives, corrosives, liquids, solids, powders and slurries is a Flex Valve specialty proved in thousands of successful applications during the last 25 years.

FLEXIBLE VALVE CORP.
740 COMMERCIAL AVENUE
PALISADES PARK, N. J.

Enter 26 on card, page 149

N.C.S.A. Zoning Brief On Critical Industry Case Accepted by High Court

In a relatively rare procedure, the Supreme Court of the United States recently accepted a motion and brief filed by the National Crushed Stone Association as *amicus curiae*—or "friend of the Court"—in the important case of *Goldblatt* v. *Town of Hempstead*. (See PIT AND QUARRY, November, 1961, page 41.)

This was done by the Court despite the unusual action of the Town of Hempstead, which filed a formal opposition to the filing of the N.C.S.A. brief. As a result, the N.C.S.A. brief will be before the members of the Supreme Court when they hear the opposing arguments of this important case.

Although the hearings on the critical zoning litigation involved will apparently be early in December, a decision and an opinion from the Supreme Court is not expected until early in 1962.

New England Lime Company Acquired by Charles Pfizer

Charles Pfizer & Company, New York, has completed its acquisition of the New England Lime Company, Adams, Mass., and has announced plans to extend that company's quarrying and processing facilities at Adams, and at Canaan, Conn. Pfizer's will also concentrate on developing new uses for lime and lime products through laboratory research.

C. C. Loomis, chairman, and William J. Ash, president of New England Lime Co., will continue to head that company's operations, which will be conducted as a division of Pfizer.

Internatl. Min-Chem. Oil Firm Plan Phosphate Venture

A 5-year plan for a joint venture between International Minerals and Chemical Corp., Skokie, Ill., and Husky Oil Company to develop phosphate reserves owned by the latter near Soda Springs, Idaho, has been agreed upon.

The Idaho reserves, estimated at 50,000,000 tons, constitute one of the largest known surface deposits of phosphate ore in the United States. Should Husky decide not to enter the project, the agreement provides for the sale of the ore deposits on an "equitable basis" to International Minerals.

The 17th annual convention of the Iowa Limestone Producers Association, Inc., will be held February 28 and March 1, 1962, at the Savery Hotel in Des Moines.

• The days of hay-burner-powered vehicles are long past, but the need for safety precautions—in terms of sane procedure in materials handling, hauling, and other plant operations—will never be out-of-date.

Lewis E. McDermut, 72, Expert in Slag Industry Dies After Brilliant Career

Lewis E. McDermut, 72, founder of the Illinois Slag and Ballast Company, Chicago, died on October 17,

L. E. McDermut

1961. He had served as president of the firm from 1923 to 1960. For the last year he has been retired. Previously he had been associated with the Illinois Improvement and Ballast Company in Gary, Ind.

Mr. McDermut was president of the National Slag Association in 1944-1945, and served as a director of that organization until 1960. He was responsible for developing a variety of uses for blast furnace slag. He was one of the winners of the N.S.A. Distinguished Service Award.

Fluid Bed Method Used In Chemical Lime Inc., Plant

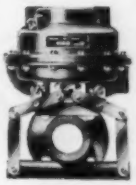
Chemical Lime Inc., near Brooksville, Fla., recently started production at its new $2.5 million plant, using the fluid bed method of making lime. The announcement was made by Clarence Camp II, president of the new firm, which is owned by Camp Concrete Rock, Inc., Ocala, Fla., and Lee Lime, Inc., Lee, Mass.

Applying an entirely new theory for the burning of lime, the company is making use of the Fluo Solids method in an upright kiln. It is estimated that two tons of quicklime can be produced in 24 hours. The facilities will operate on a 24-hour, seven-day basis.

NO JOB TOO TOUGH

ACIDS ■ ABRASIVES ■ CORROSIVES
LIQUIDS ■ SOLIDS ■ POWDERS ■ SLURRIES

FLEX VALVES



Series 7300

Series 5200

The toughest, longest-service valves you can use in pipelines carrying corrosive, abrasive, even explosive materials . . . wet or dry . . . that knock out ordinary valves in a matter of hours. In abrasive service, for example, Farris Flex-Valves outlast metal 11 to 1. Farris Flex-Valves become an integral part of your pipeline and provide full pipe capacity with nothing to block flow. They operate clean . . . even with solids in suspension or wet cement. And, they're as easy to keep clean as the pipes themselves.

Wide choice of flexible valve bodies for every process requirement. Manual or motor-operated types as well as metal-enclosed SuperSeal designs for high pressures and hazardous service.

- Non-Clogging
- Corrosion-Resistant
- Full Pipe Capacity
- No Freeze-Up In Outdoor Service
- No Obstructions, Pockets, Or Internal Parts
- Tight On Grits To 1/8"
- Maintenance-Free
- Absorbs Vibration

Write For Your Free Copy Of The Farris Flex-Valve Catalog, FL116R
As Well As Helpful Application Bulletin, FL935

PROGRESS THROUGH Farris HONEST PURPOSE

Guaranteed Not To Plug Or Your Money Back

FLEXIBLE VALVE CORP.
740 COMMERCIAL AVENUE
PALISADES PARK, NEW JERSEY

AFFILIATES: Farris Engineering Corp. • Farris Combustion Controls Corp. • Farris Universal Machine Corp. Farris Industries Canada Ltd. • Farris Engineering Ltd., London, England

Enter 27 on card, page 149

Big tonnages at lower cost

NORDBERG GRINDING

Nordberg Grinding Mills are ideally suited to meet the need for large mills to turn out greater tonnages at lower cost. Here are some of the reasons why:

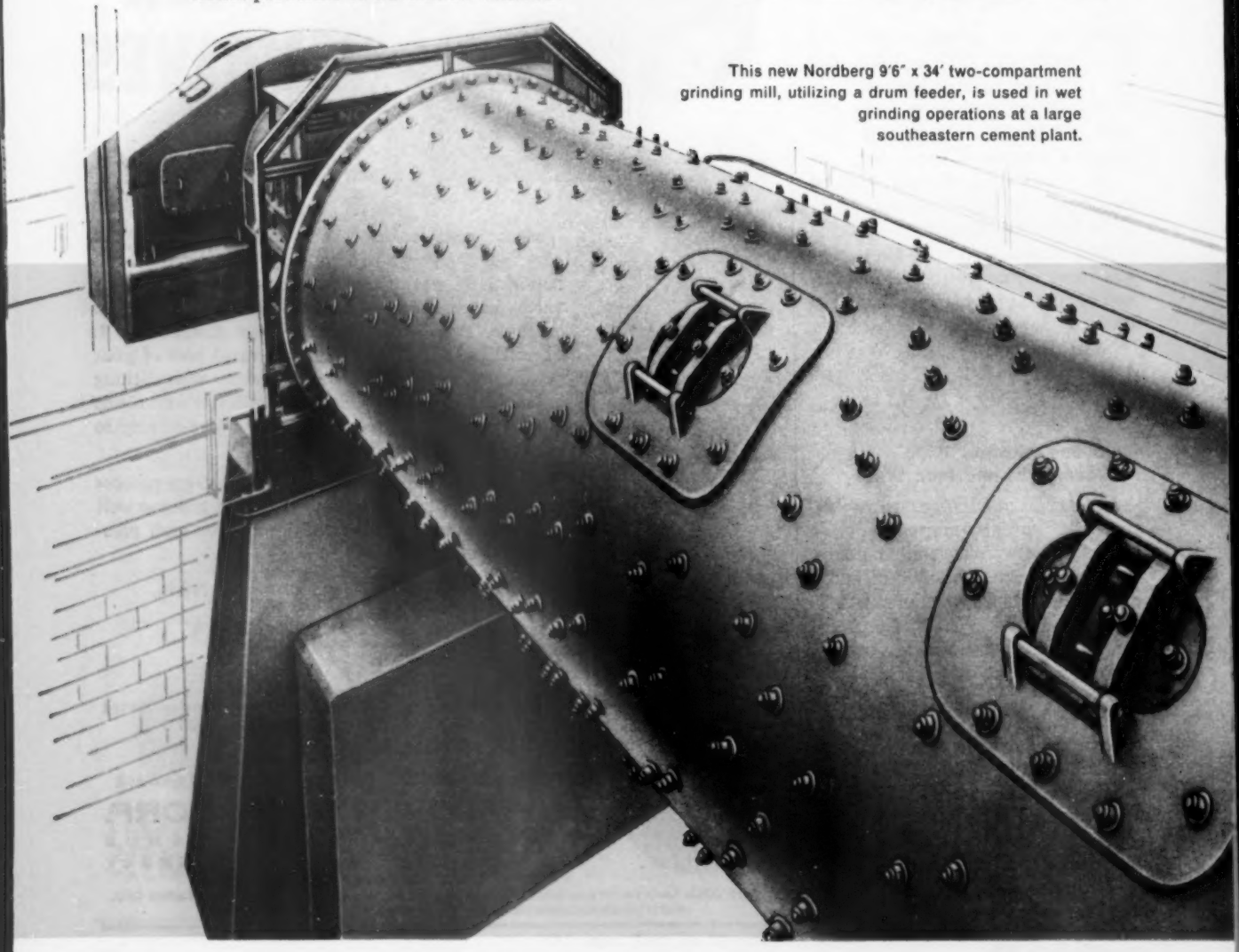
1. Lower construction and installation costs . . . A single, large mill requires less floor space than several smaller ones, and only one foundation is required. Thus, construction costs are lowered and, in most cases, production is increased.

2. Simpler automatic operation . . . Where automatic operation is required, larger mills permit simpler handling with fewer controls. This lowers initial investment and minimizes installation and operational problems of automatic controls.

3. Less maintenance . . . Here, costs are again related directly to the number of mills installed. Fewer units mean less wearing parts. Exceptional savings may also be realized in replacement liners alone.

These are significant reasons behind the current trend toward larger grinding mills.* But whether you require large or small grinding mills, you can count on the Nordberg experience to help in recommending the right grinding mill to meet your specific needs . . . including Rod, Ball, Pebble, Tube and Compartment types, in sizes from 6 to 13 feet in diameter and up to 50 feet in length. *Write for further information.*

*For example, Nordberg is now building a 13′ x 39′ two-compartment ball mill for a prominent cement company.



This new Nordberg 9′6″ x 34′ two-compartment grinding mill, utilizing a drum feeder, is used in wet grinding operations at a large southeastern cement plant.

ATLANTA · CLEVELAND · DALLAS · DULUTH · HOUSTON · KANSAS CITY · MINNEAPOLIS · NEW ORLEANS · NEW YORK · ST. LOUIS

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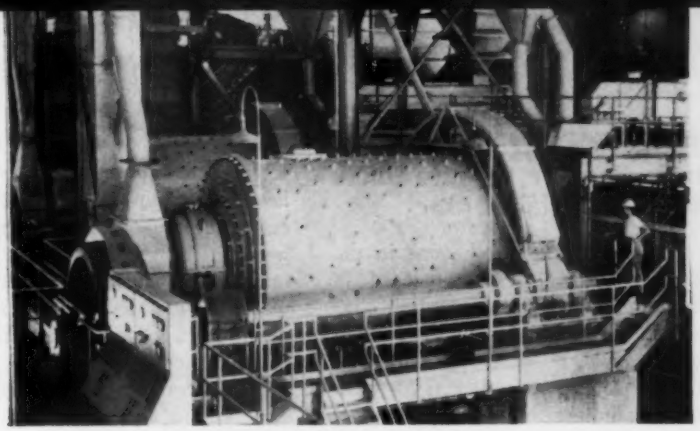
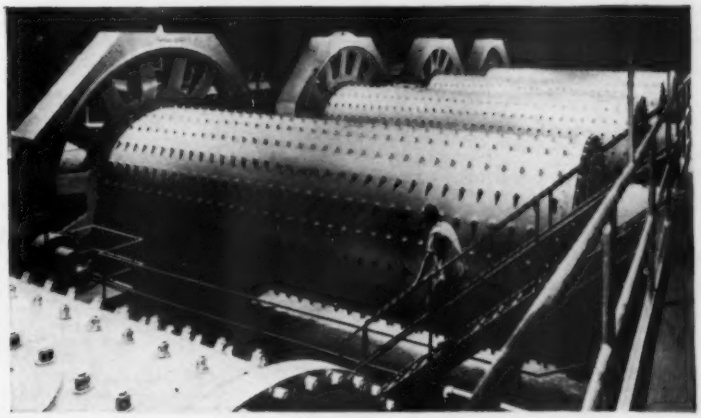
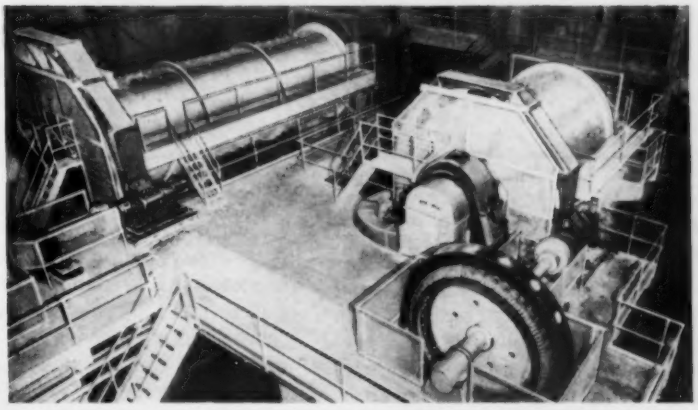
per ton with
MILLS



Shown above are two of five 11′ x 17′ Nordberg ball mills—three raw and two finish—installed in a midwest cement plant that has a capacity of 3,000,000 bbl. annually.

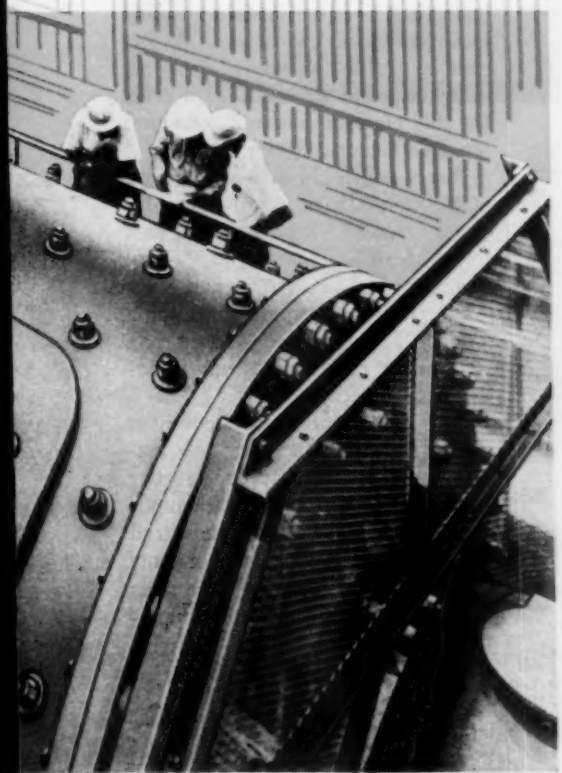


These five 12′ x 36′ Nordberg two-compartment ball mills are installed in a 5 million bbl. per year wet process cement plant in Michigan. Driven by 2500 hp motors, they are among the largest grinding mills ever built.



Raw and finish grinding in this midwestern cement plant is handled by eight Nordberg Grinding Mills. Shown here are two of these mills . . . a 10′8″ x 16′ ball mill and a 9′6″ x 32′ compartment mill.

Specify NORDBAK® . . . the Non-Metallic backing for manganese wearing parts in all types of grinding mills, crushers and other machinery where backing agents are required. Write, wire or phone your order today.



NORDBERG MACHINERY

NORDBERG
MANUFACTURING COMPANY
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GM181

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Future Construction Lags In September, Despite Gains In Residential Sector

Although continued gains in the housing sector were registered in September, contracts for future construction slipped below their year-earlier level, F. W. Dodge Corporation reported. As contracts for both nonresidential building and heavy engineering projects declined, total construction contracts for September amounted to $3,004,033,000, a decrease of 4 percent from the same month last year.

Dodge reported that *residential building* awards in September amounted to $1,380,537,000, up 8 percent from September, 1960. Both single-family housing and apartment construction contributed to the gain, but apartments continued to register the sharpest increases. Total dwelling units represented by the September contracts numbered 97,730, up 4 percent from last year.

In the *nonresidential building* sector, the major categories were below the September, 1960, level, but contracts for hospitals, public buildings and religious buildings showed increases. Total nonresidential contracts were valued at $986,887,000, down 12 percent from a year ago.

According to the Dodge figures, contracts for *heavy engineering* construction in September totalled $636,609,000, a decrease of 11 percent from last September. A steep decline in electric light and power systems and a milder setback in highway contracts were principally responsible for the over-all decrease in this category.

On a seasonally adjusted basis, contracts also declined from the relatively high rate of last month. The Dodge Index of Construction Contracts (1947 to 1949 = 100) was at 261 in September compared to 293 in August and 277 in July.

A summary of the latest figures follows:

	September, 1961	September, 1960	% Change
Nonresidential bldg.	$ 986,887,000	$ 1,124,444,000	—12
Residential bldg.	1,380,537,000	1,277,343,000	+ 8
Heavy engineering	636,609,000	716,988,000	—11
Total construction	$ 3,004,033,000	$ 3,118,775,000	— 4
	9 Mo. 1961	**9 Mo. 1960**	**% Change**
Nonresidential bldg.	$ 9,167,344,000	$ 9,215,816,000	— 1
Residential bldg.	12,218,439,000	11,620,701,000	+ 5
Heavy engineering	6,831,828,000	6,663,488,000	+ 3
Total construction	$28,217,611,000	$27,500,005,000	+ 3

Industrial Explosives Use In U.S.A. Sets Record Of Over 1 Billion Lb. in 1960

Domestic consumption of industrial explosives reached a record high during 1960, according to reports received by the U. S. Bureau of Mines. Total consumption during 1960 was 1,172,998,172 lb.—an increase of 12 percent over the previous high (1,048,576,170 lb.) reported in 1959. The gain was due to expanding use of ammonium nitrate as a blasting agent in the nation's mining, quarrying, and construction industries.

A gain of nearly 13 percent in the use of completely processed and unprocessed ammonium nitrate for industrial purposes was reported in 1960. Consumption of ammonium nitrate, combined with "high explosives other than permissibles" during 1960 totaled 1,089,216,078 lb.—14 percent more than the quantity consumed in 1959. Use of these two types of explosives for metal mining increased 46 percent; for coal mining (anthracite and bituminous), 19 percent; and for "all other purposes," 14 percent. The quantity used in 1960 for seismographic work increased slightly, but less was used for railway and other construction.

Industrial explosives used in the quarrying and nonmetallic mining industries gained more than 5 percent in 1960. Virtually all states using large quantities of explosives for this class of mineral extraction reported higher consumption.

States which showed an increase of 1,000,000 lb. or more were: Alabama, Hawaii, Illinois, Michigan, New Mexico, New York, Ohio, Pennsylvania, and Virginia. Sales for quarrying and nonmetal mining totaled 262,748,455 lb.—more than 22 percent of all industrial explosives consumed in 1960.

The Bureau of Mines requested all known manufacturers of ammonium nitrate to supply statistics on production and sale of ammonium nitrate for use as an industrial explosive in 1960. Respondents were asked not to report their sales of ammonium nitrate to other manufacturers of explosives or to members of the Institute of Makers of Explosives, to avoid duplication of data.

Fallout Shelter Planned By Gouverneur Talc Co.

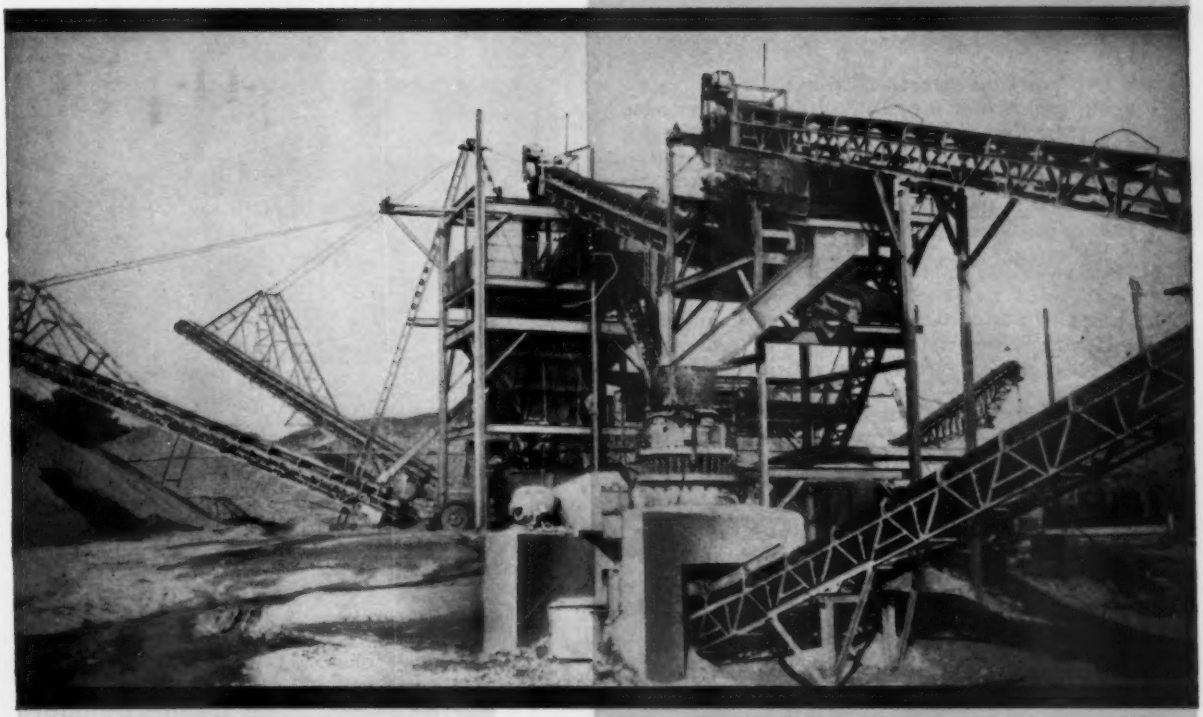
Gouverneur Talc Company, Gouverneur, N. Y., is preparing a plan for plant and employee fallout protection as a result of a meeting with the county civil defense director. Howard W. Adams, assistant to the vice-president of Gouverneur Talc, was named civil defense plant coordinator.

A fallout shelter in the mine, 150 ft. below the surface, will be available for a small number of employees. As a part of the program, employees will be trained in the shut down of plant operations and closing-off pipelines. Access to the mine by an old shaft, not depending on electric power, will be maintained. A two-way radio, to be used for alarms and information, will be installed and co-ordinated with the county warning center. A surface shelter as control station is also being considered.

Management has also urged employees to build family shelters.

The newly formed Rock Springs Sand & Gravel Company, Decatur, Ill., will begin operations in spring of 1962. Heading the company, which will process and sell sand and gravel, are John W. Massey Jr., Orval R. Wilcox, and Elmer V. Johnson.

HOLLY MANUFACTURING AND MINING COMPANY processes 300-400 tons of gravel per hour with 5 SIMPLICITY screens!



Write for information on Simplicity equipment today.

At the Holly Manufacturing and Mining Company, Holly, Michigan, pit run gravel is brought from the pit to a surge pile on belt conveyors. From the surge pile, a belt conveyor takes the gravel to a Simplicity 5′ x 14′ Model "D" 2-deck screen. At this point, all oversize material, including rocks up to 8 inches in diameter, is run through a cone crusher and then re-circulated to the screen. A belt then takes all through material to two Simplicity M-11 4′ x 12′ 3-deck screens where the gravel is washed, sized, then stockpiled to be used as needed. The other 2 Simplicity screens are used for processing special products.

All 5 Simplicity screens have been in operation for over two years, part of the time on a two-shift schedule, with a minimum of down time.

Gravel plant operators are getting quick, economical and dependable processing of their material with Simplicity Screens, Feeders and Conveyors.

Simplicity
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SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.
FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario.
FOR EXPORT: Brown & Sites, 50 Church Street, New York 7, N. Y.

No. 5 in a series of announcements on new **HOUGH** *machines*

This new 60-ton tractor is so different there is

nothing like it

in design, or in performance on push-loading and dozing work

For two years on several multi-million-yard earth-moving jobs a new idea in push-loading has been under extensive and sustained operation behind a variety of scrapers. This new idea is the HOUGH D-500 PAYDOZER — a different and better kind of rubber-tired pusher and dozer as shown by its performance on these projects.

More Power. A 700 hp turbo-charged V-12 Cummins diesel is governed to 2100 rpm and 600 hp for longer life and lower maintenance. Two newly-developed, high-efficiency dry-type air cleaners plus filtration of all oil circuits are provided.

Articulated Hydraulic Steering is one of the most unusual features and gives exceptional maneuverability. The turning radius is under 25-ft.—considerably less than its overall length and one-third less than a comparable unit with rear-steer. The rear wheels always track the front ones and always follow in the path cut. Combined with 30° rear-axle oscillation, this articulated steering keeps "all four feet" on the ground and also permits a twisting "walk-out" action in poor footing.

Wide-range Drawbar Horsepower. The power train includes a 3-stage, single phase, torque converter, a HOUGH-built full-power-shift transmission, power-transfer differentials in *both* axles and planetary hubs in all wheels. This drive train provides 80% of peak draw-bar horsepower over 75% of the entire speed range so it can push-load efficiently with a wider range of scraper sizes.

Three-way Blade and Push Block. Blade is 160" wide—extending 10" beyond the wheel path on each side, and has special reinforced center area for pushing. Six-way hydraulic control includes raise, lower, tilt to each side, forward and backward pitch. Modified wings help retain the load

while adjustable stabilizer shoes permit precise grade control. A separate pusher block is optional.

Unusual Stability and Smooth Riding are features the operator will notice and appreciate. These are achieved by the approved use of dry ballast material (100% heavier by volume than liquid) in all four tires. It lowers the center of gravity and also reduces the bouncing action usually found in unsprung machines. Standard tires are 33.5 x 33-26 PR, with options including 37.5 x 33. The 4-wheel brakes are air- controlled with dual pedals for operator convenience.

High Availability. One example of the many extra features in this unit to keep it profitably at work and reduce downtime is the separate fan-cooled oil-to-air cooler to effectively control transmission-converter oil temperatures. Full-shift fuel capacity is provided. An optional central lubrication system can be furnished that automatically lubricates 27 different points every 30 minutes of operation.

Your HOUGH Distributor is ready to show you why there is nothing like the D-500 PAYDOZER.

THE FRANK G. HOUGH CO. 12-B-1
750 Sunnyside Avenue, Libertyville, Ill.

Please furnish complete data on the D-500 PAYDOZER

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Title _____

Company _____

Street _____

City _____ State _____

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LIBERTYVILLE, ILLINOIS
SUBSIDIARY - INTERNATIONAL HARVESTER COMPANY

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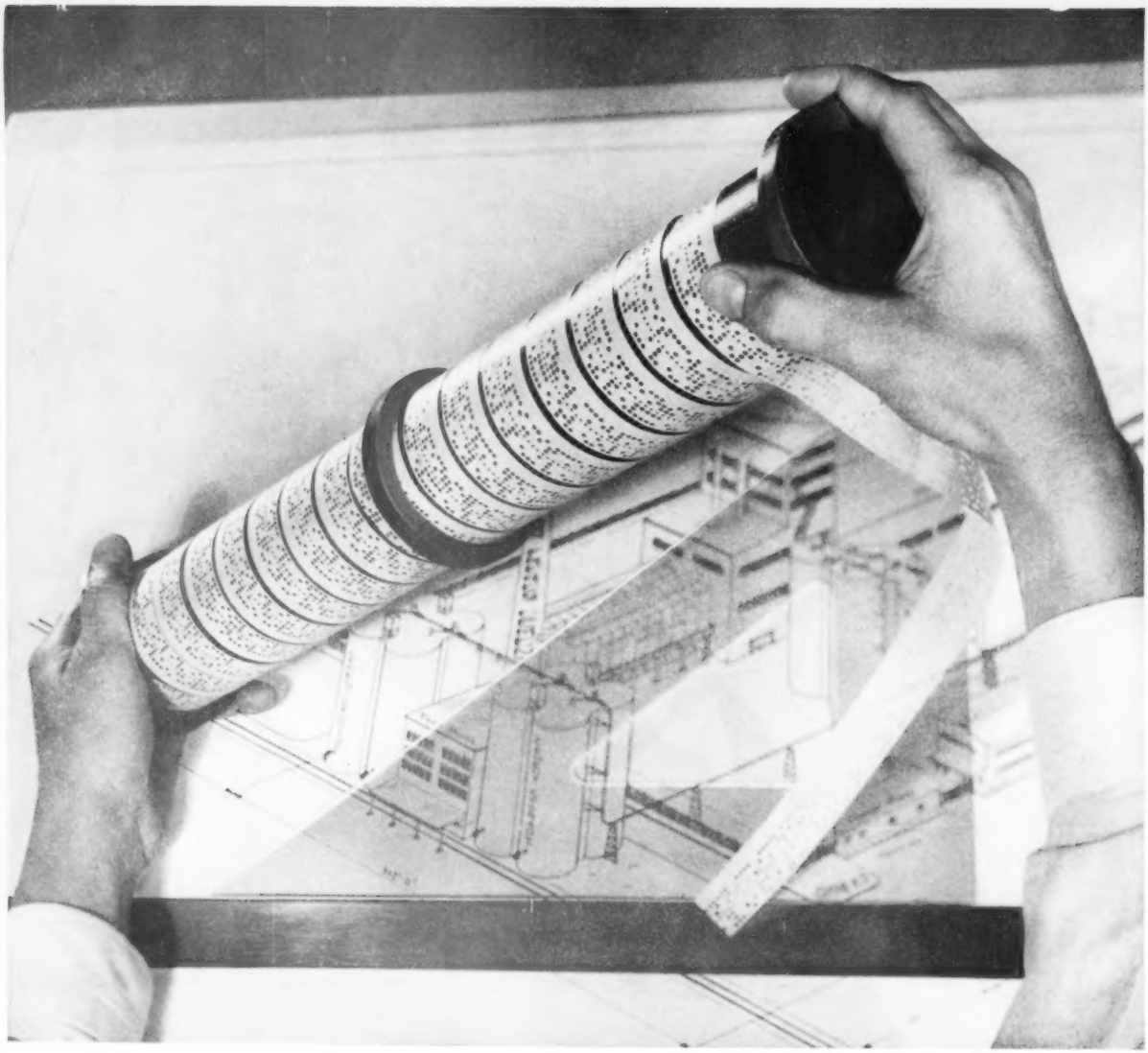

Traylor designs a multitude of kilns by computer

. . . to make sure you get the one design that's best for you

Before the kiln you order gets into metal—before it even reaches the drawing board—Traylor engineers develop from their computer the preferred design variations appropriate to your requirements, including maintenance.

Stored on punched paper tape is the knowledge and experience of many engineers over many years. Months of calculations are done in days or hours. Traylor engineers are freed from routine and repetitive computations for the more creative task of ***evaluation*** . . . determining which of the almost infinite combinations of vital variables will assure you the best kiln design, the highest thermal efficiency not only of the kiln itself but of auxiliary equipment, too.

The Traylor computer is programmed to solve many major problems in addition to basic kiln design . . . including clinker cooler air and heat balance, dew point of kiln exhaust gases, analysis of kiln heat and air flow.

Through its own facilities and those of Fuller Company, Traylor brings to bear on your kiln problems a breadth of process know-how long recognized by industry as unexcelled.

Call in Traylor early in your plans. Write outlining your requirements. Traylor experience is at your service. Literature is available on request.

See Pit and Quarry Handbook for details and specifications.

TRAYLOR ENGINEERING & MANUFACTURING

DIVISION OF FULLER COMPANY

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TKA-14

Management Techniques To Star at Show, Meeting On Engineering, Upkeep

A new emphasis on management techniques will be featured at the next Plant Engineering and Maintenance Show and Conference at Convention Hall, Philadelphia, January 22 through 25. This shift of emphasis is necessitated by the vast new areas of scientific knowledge and engineering skills developed since the show and conference started in 1950.

Although many of the 43 conference sessions will still be devoted to discussions of preventive maintenance, repairs, and inspections, new subjects have been added to cover management techniques. Included will be cost control, operation-time control, work sampling, personnel relations, motivation of supervisors, plant communications, and similar tools of management.

Exhibits will be of unprecedented variety and scope. The show will occupy the largest exhibit area in its history, with more than 400 companies exhibiting.

Some of the fields in which these speakers are involved are the construction and cement industries. Although most of the sessions will be devoted to general topics affecting all industries, 12 of the conferences will be "problem sessions" devoted to single industries, among them the cement manufacturing business. F. C. Longenbach, maintenance engineer, Alpha Portland Cement Company, Easton, Pa., will lead a discussion on plant engineering and maintenance in cement plants.

Lime Sold and Used in August, 1961

Lime sold and used in August, 1961 (1,139,374 short tons), increased compared with the previous month, according to reports released by producers to the U. S. Bureau of Mines.

Increases were reported in agricultural, construction, chemical, and other industrial, and refractory lime. Open-market lime constitutes 63 percent of the total lime reported; the remaining 37 percent is captive tonnage, according to the 1960 annual lime canvass.

Lime Sold and Used by Producers[1] in the United States, in Specified Periods of 1960-61, by Types and Major Uses in Short Tons

	July	August		January-August	
	1961	1961	1960	1961	1960
By types:					
Quicklime	803,188[2]	899,187	742,585	6,441,276	6,241,364
Hydrated lime	221,053[2]	240,187	256,693	1,731,856	1,840,792
Total lime	1,024,241[2]	1,139,374	999,278	8,173,132	8,082,156
By uses:					
Agricultural:					
Quicklime	5,982	9,113	5,480	83,950	39,606
Hydrated lime	6,463[2]	6,182	6,613	71,653	75,002
Total	12,445[2]	15,295	12,093	155,603	114,608
Construction:					
Quicklime	4,675	5,907	7,318	47,665	55,596
Hydrated lime	99,515[2]	114,132	95,614	705,189	632,299
Total	104,190[2]	120,039	102,932	752,854	687,895
Chemical and other industrial:					
Quicklime	633,160[2]	692,327	596,436	5,117,051	4,699,253
Hydrated lime	115,075[2]	119,873	154,466	955,014	1,133,491
Total	748,235[2]	812,200	750,902	6,072,065	5,832,744
Refractory (dead-burned dolomite)	159,371	191,840	133,351	1,192,610	1,446,909

[1] The monthly canvass excludes the output of plants producing less than 10,000 tons a year.
[2] Revised figure.

A.R.B.A. Issues Estimates On Highway Materials Needed for 1961-1972

The latest authoritative estimates of material requirements for the current national highway program have been published by the American Road Builders Association. Estimates are based upon the size of the program that can be financed under the Federal-Aid Highway Act of 1961 and other foreseeable financing, in addition to a road maintenance program which now amounts to about $2.5 billion annually, and is rising in increments of $100 million annually.

Estimates of cement requirements for 1961 are given as 79,100,000 bbl.; for 1961-1972, 1,000,600,000 bbl. Aggregate requirements are 764,000,000 bbl. for 1961, and 9,720,000,000 bbl. for 1961-1972.

Vanport Stone, Incorporated Bought by Alliance Group

A group of men from Alliance, Ohio, have formed a corporation and purchased Vanport Stone, Inc., New Castle, Pa. Vanport operates four plants in Lawrence County, Pa., and a fifth in Sharpsville; it also has rights to a deposit of 1,500 acres of material in the New Castle area. The equipment is valued at $1,500,000.

John Liber is president of the organization purchasing the Vanport firm. Donald D. Phillips, owner of the East Ohio Limestone Company, Hartville, Ohio, is vice-president.

• Correction

In a news item appearing in our November issue it was indicated that Four Lakes Fuel and Supply Company, a subsidiary of Janesville Sand and Gravel Company, Janesville, Wis., is a producer of sand and gravel and ready-mix. The firm produces only ready-mix, and obtains the aggregates needed in its operations from other plants of the parent firm.

The seventh annual convention of the National Bituminous Concrete Association is scheduled to be held February 17 to 22, 1962, at the Flamingo Hotel in Las Vegas, Nev.

Profit-Sharing Check Paid To Widow of Executive Of Marblehead Lime Co.

Mrs. Wallace E. Wing, widow of the late board chairman of Marblehead Lime Co., recently received a check for $64,364.74 under a profit-sharing plan from Col. Henry Crown, chairman of the board of Material Service Division of General Dynamics Corporation. Material Service acquired Marblehead Lime in 1948. Mr. Wing had been with Marblehead from 1922 until his death last year.

The success of the Material Service profit-sharing plan has attracted nation-wide attention. The company contributes 15 percent of each employee's annual salary, and the total contribution is linked to 5 percent of the company's profits before taxes.

Mrs. Wallace E. Wing accepts $64,000 profit-sharing check from Col. Henry Crown (right), as her son, Wallace, watches.

$8 Million Modernization Planned by Medusa For White Cement Plant

Medusa Portland Cement Company, Cleveland, Ohio, will spend $8,000,000 over the next five years to modernize its white cement operation in York, Pa., according to Worth Loomis, corporation secretary and assistant to the president. Primary purpose of the York program is to replace 55-year-old equipment with new machinery, including the installation of a modern dust collecting system.

The program is a part of an overall company plan to spend $70,000,000 during the coming decade to improve its plants in Wisconsin, Illinois, Ohio, Pennsylvania, and Canada.

Honeywell Offers Courses On Control, Instrumentation

The oldest school of its kind in the United States—Minneapolis-Honeywell's Philadelphia-based Instrumentation Education center—is expanding its curriculum for 1962.

Two special courses, "Control Dynamics" and "Fundamentals of Instrumentation," are being offered in addition to regular instrument services and maintenance classes. Since 1935, when the school was founded, it has been attended by more than 6,000 persons from 33 countries and representing every major industry and many government agencies.

Both courses follow the college format of lectures, demonstrations, student participation exercises, and written examinations.

Geographical Engineering Predicted by A.S.C.E. Head

The possibility of "geographical engineering" through the peaceful use of nuclear power was forecast at the convention of the American Society of Civil Engineers in New York, October 16 to 20, by Dr. G. Brooks Earnest.

Dr. Earnest, in taking office as the 93rd president of the 109-year-old society, the oldest national engineering organization in the United States, said that at the Nevada and Eniwetok tests, a great deal was learned in the application of thermonuclear explosions to earth-moving purposes.

"The potentials suggest a new field of geographical engineering," he declared. "On the northwest coast of Alaska, if all goes well, there will soon be an entire harbor excavated by nuclear explosions. The savings on such a project can be calculated."

As the new A.S.C.E. president, Dr. Earnest succeeds Glenn W. Holcomb, Corvallis, Oreg., in heading the 48,000-member society, which was founded in 1852.

Four-Way Merger Effected By Washington Concerns

Associated Sand & Gravel Company, Everett, Wash., has changed its name to Associated Sand & Gravel Company, Incorporated, as a result of a merger with Everett Paving Company, Everett Development Company, and Skagit Valley Paving Company.

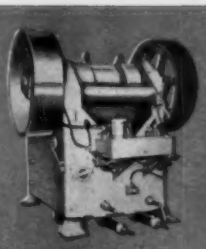
Officers of the newly-formed corporation will be George P. Duecy, president; Howard F. Sievers, executive vice-president; Wallace H. Ross, secretary; and Edward J. Basse, treasurer. No changes in management or personnel are contemplated, and the company offices will continue to be located at Everett, Wash.

World Wide Cement News

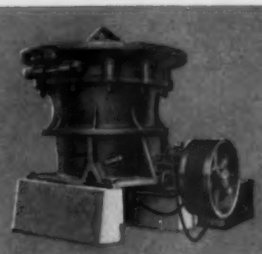
Peru—Compania Peruana de Cemento Portland, S.A., of Lima has recently received a ten-year, 5¾ percent $1,500,000 loan from the Inter-American Development Bank to consolidate its production facilities.

Brazil—According to the Brazilian industrial association of cement manufacturers, production in 1961 should reach 5,500,000 tons, a considerable increase over the 4,400,000 tons of 1960 (16.3 percent over 1959). In 1962, the total is expected to be 6,000,000 and in 1963—6,500,000 bbl.

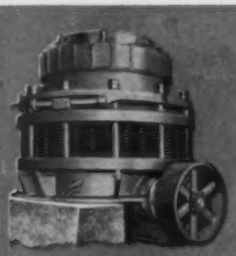
Argentina—Minera Alumine S.A., Ind. Com. y Fin, Buenos Aires, an Argentine combine, has placed an order for a portland cement mill in Neuquen, Patagonia. A German firm, the Dusseldorf works of Gutehoffnungshutte Sterkrade A.G., is to erect the plant. Designed for an initial daily output of 150 tons, the mill can be expanded to 450-ton capacity.



JAW CRUSHERS

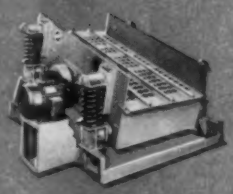


GYRATORY BREAKERS



GYRASPHERE CRUSHERS

H. D. APRON FEEDERS



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EFFICIENT EQUIPMENT

Efficiency in aggregate equipment is its ability to earn a profit *consistently* for you! Telsmith *builds it in*. That's the *why* of Telsmith's low upkeep, high capacity *and* lowest cost per ton crushed, in producing specification aggregate.

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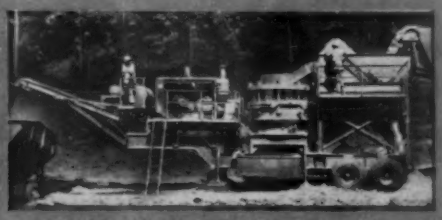
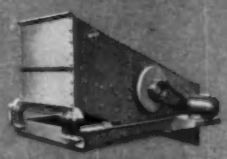
sound aggregate for sound construction



PORTABLE CRUSHING-SCREENING PLANTS



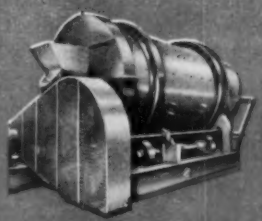
VIBRO-KING SCREENS

HORIZONTAL SCREENS

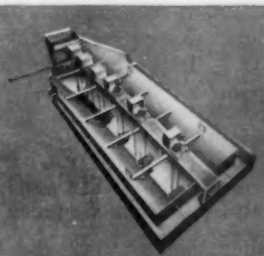
EXCELLENTLY ENGINEERED

Modern engineering . . . over 50 years of experience in making aggregate machinery . . . advanced design and construction . . . finest factory facilities. One machine or a complete plant—Telsmith is your best buy for reliability and profits.

Send for Equipment Guide 266



SUPER-SCRUBBERS



SAND CLASSIFYING TANKS

SAND CLASSIFIERS

E-21

SMITH ENGINEERING WORKS / DIVISION OF Barber-Greene

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I.M.C. Expansion Program At Carlsbad Potash Plant To Be Finished This Year

Completion of a multiple-project program of expansion and improvement costing more than $1.8 million at the Carlsbad potash operation of International Minerals and Chemical Corporation is expected by the end of this year, according to E. C. Skinner, operations manager of the potash facilities.

Included in the improvement program is a $300,000 Goodman potash borer now installed and under study. This machine is designed to remove the ore from the face in the mine and transfer it to haulage equipment, eliminating several steps in the normal mining process.

The largest single item in the program, also near completion, is a 10,000-ton raw-ore storage building near the firm's No. 1 shaft, through which all ore from all sections of the mine is hoisted to the surface. Coupled with the present storage capacity for crushed ore, this building will provide a surge capacity for a shutdown of as long as 24 hours in either the mine or refinery and will eliminate most delays resulting from a temporary interruption in either mine or refinery operation.

● At the Barberton, Ohio, limestone mine of the Pittsburgh Plate Glass Co. (Chemical Div.) this electric battery-powered Cushman Truckster efficiently moves men and materials through 45 to 50 miles of tunnels. There are 12 units in all. Operating and maintenance costs are low, and big savings are realized in reduced travel time of personnel. The Trucksters can be driven at speeds up to 15 m.p.h.

1960 Canadian Lime Report Shows Drop From '59 Record

The shipments made by the Canadian lime industry during 1960 were notably smaller than those of the record year, 1959, because of a drop in demand. Although plant capacity exceeded national requirements (36 percent over shipments), two new rotary lime kilns were put into operation at established plants in Ontario and Quebec.

Production in 1960 amounted to 1,220,804 tons of high-calcium and dolomitic quicklime and 312,869 tons of hydrated lime, with a total value of $17,000,000. This tonnage was 9 percent less than that of 1959, the bulk of the decrease being in quicklime. The most notable change in volume took place in Ontario, where production dropped by 141,033 tons, or 12 percent.

Lime is imported in small amounts for a few smaller markets more favorably situated in relation to United States lime plants. In addition, minor quantities of special types not produced in Canada are imported. Total exports, lower in volume than imports, and go mainly to the United States.

Cement Industry Round Table Held at Controllers' Meeting

Paul Duncan, vice-president, treasurer, and assistant secretary, Marquette Cement Manufacturing Company, conducted a cement industry round table at the 30th annual conference of the Controllers Institute of America. The conference was held November 5 to 8 in the Palmer House, Chicago, Ill.

Ralph F. Rau, treasurer and assistant secretary, Missouri Portland Cement Manufacturing Company, served as vice-chairman of the round table. He spoke on *Long-Range Planning for a Cement Company*.

Other speakers at the round table were Robert W. Fort of Medusa Portland Cement Company and Harold L. Irick, Louisville Cement Company.

Community Bomb Shelter Backed by Indiana Concern

Management of Rockledge Products, Inc., Portland, Ind., has announced that the firm will solicit families interested in renting space in a bomb and fallout shelter large enough to accommodate 4,000 persons. The proposed underground shelter, to be constructed underground with 22 ft. of earth and 30 ft. of solid stone above it, would have dormitory, lighting, water, hospital, ventilation, food storage, sanitation, and decontamination facilities.

The project would be financed by rental of rights to residents at $100 per person for a five-year period. The plan, approved by the Portland city council, reportedly would enable all residents in Jay County to reach the shelter within an hour (driving time).

Rockledge produces crushed limestone and concrete items.

8 Percent Tax Credit Proposal Expected to Reappear in '62

Although a general tax bill was not reported by The House Ways and Means Committee for the recent session of Congress, a tentative proposal included the much-discussed 8 percent tax credit to be applied to investments in new equipment. The proposal will be reconsidered next year.

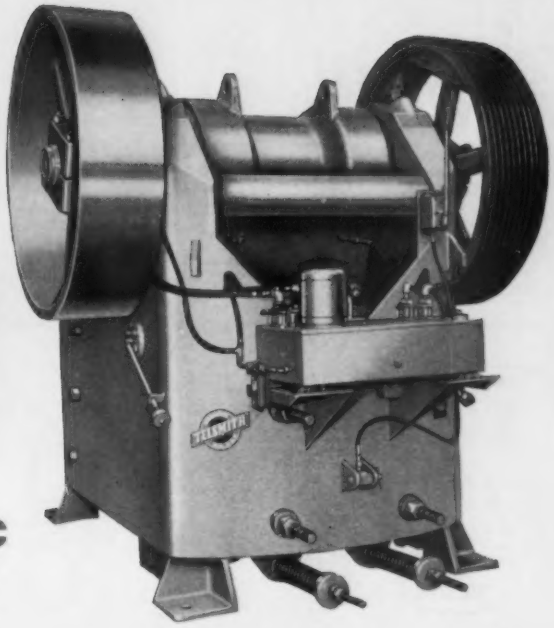
Also expected for consideration is the Boggs Bill (HR640) which affirms that money spent for the purpose of influencing legislation need not be disallowed as a necessary business expenditure in computing income tax.

A gravel pit near Mooresville, Ind., will soon go into operation. Mr. and Mrs. Paul Swisher, owners of the 40-acre tract, intend to develop a private lake after the gravel has been mined.

completely

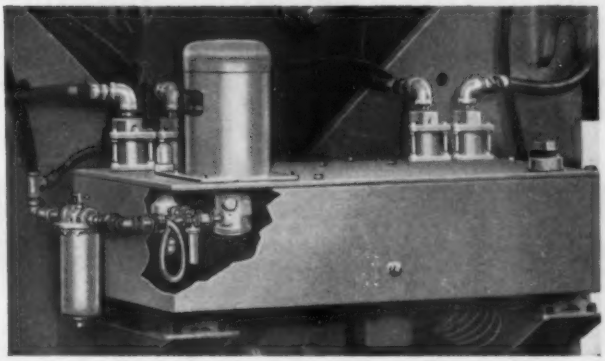
NEW

AUTOMATIC OILING SYSTEM



Available as optional equipment on 30" x 42" and 42" x 48" sizes

- *bearings last longer*
- *lube costs go down*
- *capacity goes up*
- *PROFITS are BIGGER*



the ODDS are 80 to 1 in your favor

Now under severest abrasive dust conditions Telsmith Jaw Crushers run cooler at full capacity with oil changes every 4 months and *no time out for lubrication in between*. From 80 grease jobs to 1 oil change! More vital, you automatically end bearing failure due to improper lubrication. Filter-fresh oil in correct quantities circulates automatically, greatly prolongs bearing life, improves crusher performance. Find out why and how this newest jaw crusher development will save you many times its cost. Ask your Telsmith distributor.

HOW THE SYSTEM WORKS

Oil is pumped through the filter into crusher bearings and returns to the reservoir through flexible hoses. The pressure by-pass serves to insure a flow of constant pressure to the bearings and the temperature sensing device sounds an alarm if the oil temperature exceeds an acceptable limit.

The pressure-temperature control switch is mounted on the bottom of the tank for easy access. The tank can also be fitted with heating elements for cold weather starting. *Send for Bulletin 280.*

J-4-361

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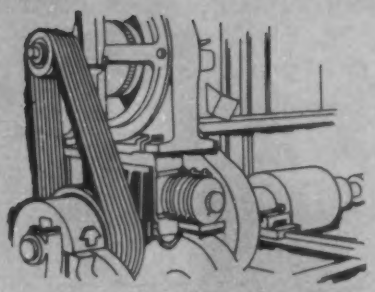
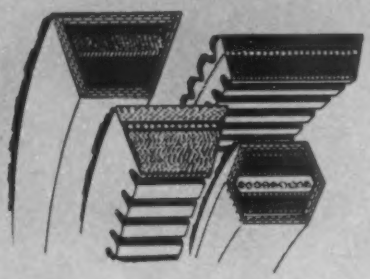
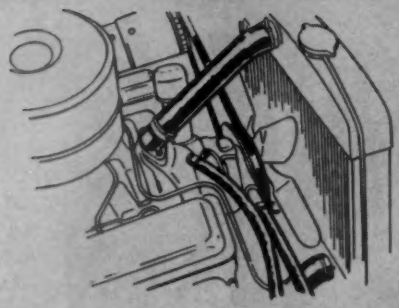
V-BELT DRIVES

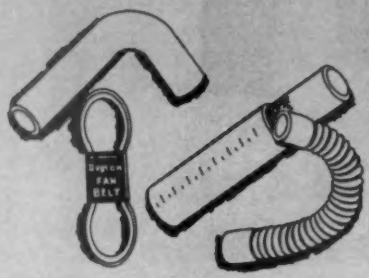




Dayco offers the only complete line of V-Belts in the industry for every power transmission need—from fractional to 1,000 and more horsepower.

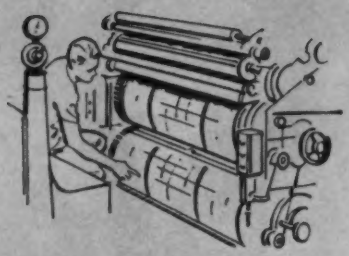
AUTOMOTIVE PRODUCTS

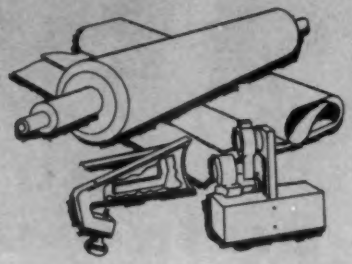




Dayco provides a complete line of Fan Belts, Radiator Hose, and other rubber products for passenger cars, trucks, busses, and tractors.

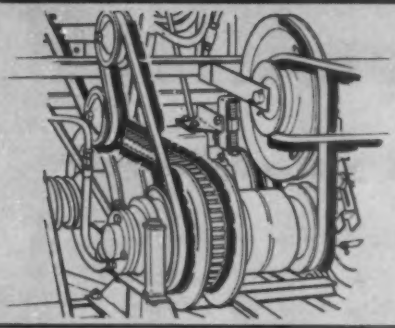
PRINTING PRODUCTS

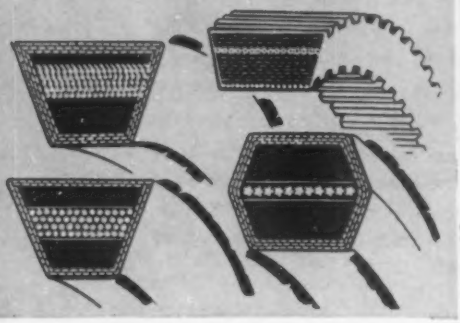




Dayco offset and letter press rollers, Gold Seal offset Blankets, Color Separators and Fountain Dividers, for all makes of presses.

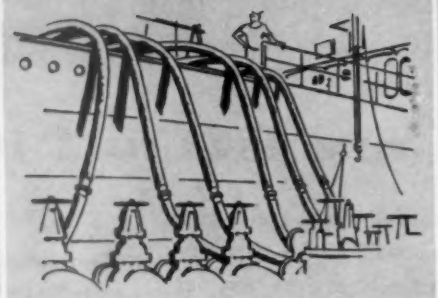
AGRICULTURAL V-BELTS

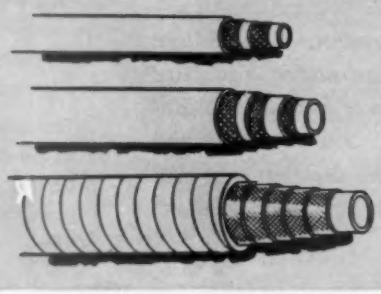




Dayco builds specialized V-Belts for the efficient transmission of power on all types of traction, propulsion and auxiliary farm implement drives.

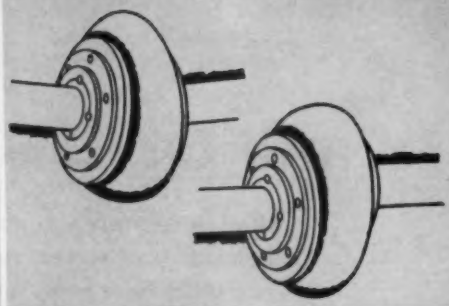
INDUSTRIAL HOSE

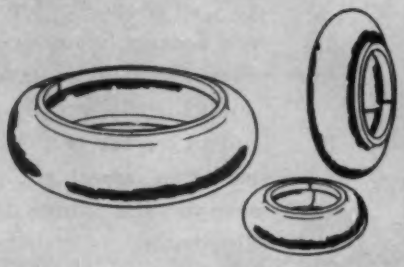




Dayco offers molded and horizontal braided, machine and hand wrapped fabric, and woven jacket constructions for all industrial applications.

MOLDED RUBBER





Dayco custom-engineered molded rubber, rubber-to-metal and rubber-and-fabric components for mechanical applications.

Dayton

Take your pencil. Get all the Day**ton** literature from your files. Make one little change. In place of Day**ton** write Day**co.**

From now on, that's our product name. **Dayco** V-Belts. **Dayco** Hose. **Dayco** Printing Rollers and Blankets. **Dayco** Molded Rubber. **Dayco** Agricultural and Railway Drives.

Thus ends the difference between our corporate name, Day**co** and our **former** product name, Day**ton.**

Let us repeat. The only thing that's changed is the name. The same high quality. The same broad line. The same friendly, helpful people. Only their product line is now **Dayco. DAYCO. D-A-Y-C-O.**

Dayco CORPORATION

Rubber Products Division — Melrose Park, Illinois

(Formerly known as The Dayton Rubber Company)

Agstone Tonnage Declines From 1960 Volume—Midwest States Use Most

The use of agricultural limestone in 1960 dropped slightly for the second consecutive year, according to the National Limestone Institute's annual tonnage survey of liming materials. Inquiries among limestone producers and various agricultural agencies and authorities in all areas of the United States showed that 22,613,599 tons were used in 1960—a decrease of slightly more than 100 thousand tons from the amount used by American farmers in 1959 and about 600 thousand tons below the 1958 volume. The 1960 amount used is only 28 percent of the 80,000,000 tons that agricultural specialists say should be applied annually on the nation's farms.

In 1960 Illinois was again the leading state, with 3,100,000 tons. The three other states near the top were Missouri, with 2,200,000; Ohio, with 2,100,000; and Indiana, with 1,800,000 tons. As in the past, the Department of Agriculture's Conservation Programs have been the primary influence in promoting the use of agstone, accounting for approximately 75 percent of the total tonnage.

Many agronomists in the humid area of the country are concerned because aglime use has been decreasing in some states during the last few years. Farmers are caught in a squeeze of higher costs for the goods and services they must buy and lower prices for the products they sell. However, since the price of agstone has remained fairly constant during the last 20 years, the benefits from aglime application make one of the best investments available to a farmer in raising his production and improving the efficiency of his operation.

Sulphurdale Chemical Co. Erecting Plant in Utah

Sulphurdale Chemical Company, a newly-formed company, is erecting a $250,000 mill near Cove Fort, Utah, for the production of powdered and beaded sulphur at the rate of 100 tons a day. The company will utilize ore grinding and flotation to extract sulphur from conglomerate rock formations which contain between 30 and 70 percent sulphur.

E. L. Lewis, general manager of the firm, stated that beaded sulphur to be marketed in northern Utah will be 99 percent pure.

Publication Discontinued By *The Explosives Engineer*

The Explosives Engineer, a magazine which serves the explosives-consuming industries, will terminate its activities with the publication of the November-December, 1961, issue. Published periodically by Hercules Powder Company since 1923, this journal has been considered the unofficial "Bible" of explosives users.

In 1925 the publishers of the magazine conceived the idea of a national safety competition for the mineral industry. Bengi del Piatta, a noted sculptor, was engaged to execute the original "Sentinel of Safety" trophy, which has become the symbol of the awards in this competition.

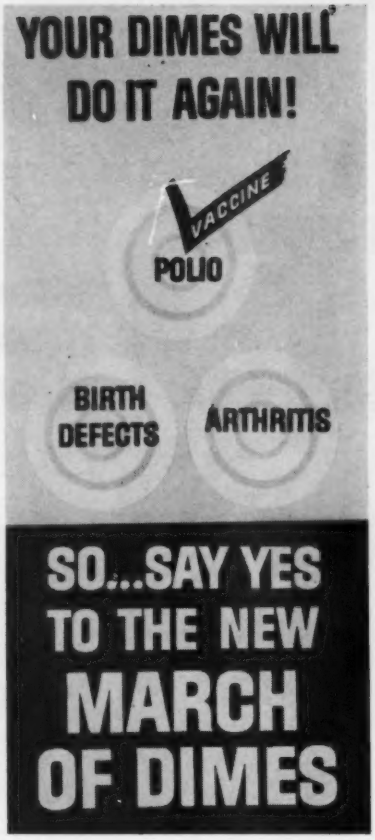
The safety competition was co-sponsored from the beginning by the U. S. Bureau of Mines, which will now continue the sponsorship of this project.

Kermac Potash Co. Formed To Mine Carlsbad, N. M., Site

A new partnership, Kermac Potash Company, was recently formed by Kerr-McGee Oil Industries Inc., Oklahoma City, and the National Farmers Union Service Corp., Denver, to mine and mill extensive potash reserves near Carlsbad, N. M. Construction of a 1,500-t.p.d. plant is to be started soon, but no final date for the start of mining operations has been set.

National Farmers Union acquired the lease on the potash site several years ago, and then teamed with Phillips Petroleum and Kerr-McGee to form Farm Chemical Research Development Corporation. Subsequently, a shaft was put down on the site, and a long-range research program was initiated to determine the mining and processing requirements of ore obtained from the site. The new firm is an outgrowth of this activity.

Kermac Potash is a wholly owned subsidiary of which each parent company will own 50 percent. A large-scale pilot plant program is being launched immediately at Kerr-McGee's metallurgical research laboratory at Golden, Colo.



• • •

Bestwall Gypsum Company's $7,500,000 plant at Wilmington, Del., is scheduled to begin operations in January, 1962, according to President Rawson G. Lizars. The Wilmington operation, Bestwall's 11th, will provide approximately one-half of the company's projected increased Middle and North Atlantic productive capacity.

Plans were completed in October by Permanente Cement Company to build a cement distribution plant near Lihue on the Hawaiian Island of Kauai. The depot will have a storage capacity of approximately 2,000 bbl., and will be the fourth Permanente distribution center in the Islands.

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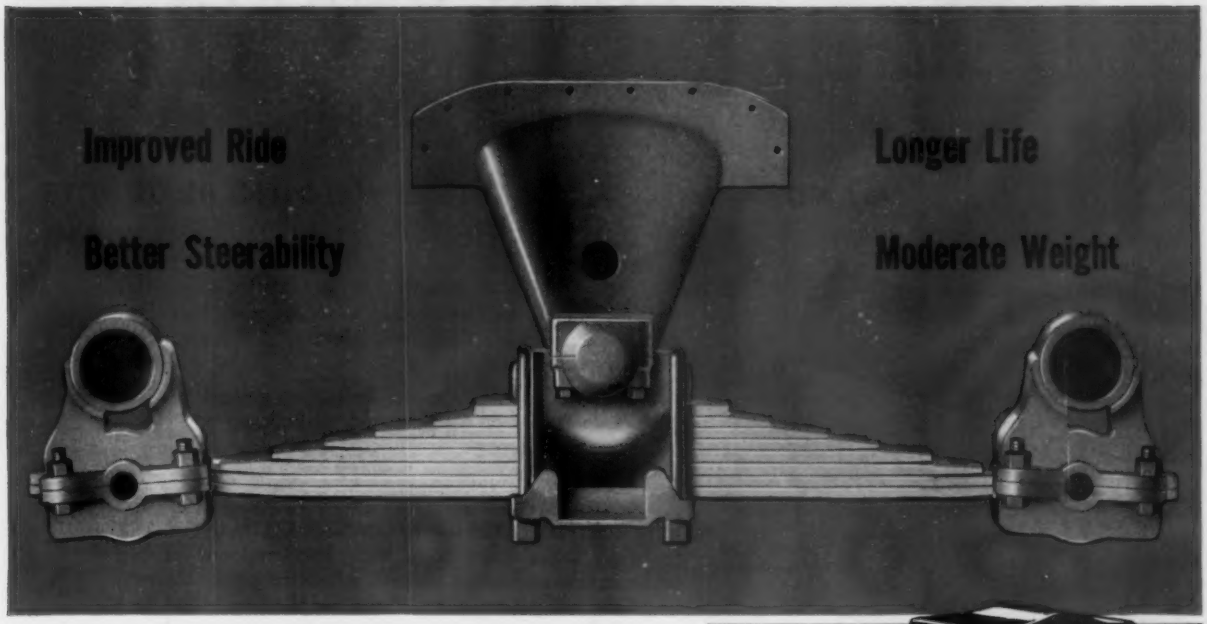
A NEW TANDEM SUSPENSION



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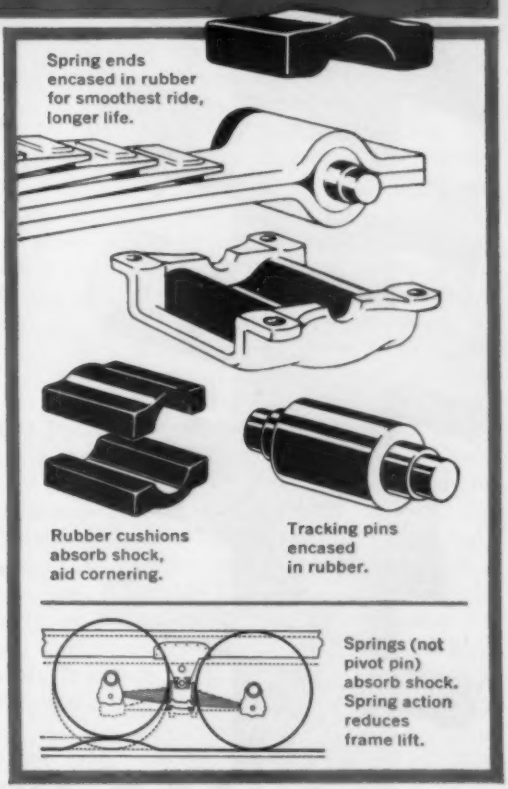
RUBBER!

This new Eaton suspension takes full advantage of tough, resilient rubber at all points of movement. The result: a smoother ride (loaded or empty), long trouble-free service, more payload and easy, quick servicing when required.

Springs are long, widely spaced with variable rate. Spring ends have rubber cushions and bushings. Rubber inserts between spring leaves reduce interleaf friction. Rugged tracking pins are suspended in rubber. All these mean more driver comfort, more cargo safety, longer equipment life on or off the highway.

Drive and alignment are through **two** main leaves and tracking pin. No lubrication is required.

Ask your truck dealer for complete details on the new Eaton Tandem Suspension, or write us direct.


Spring ends encased in rubber for smoothest ride, longer life.
Rubber cushions absorb shock, aid cornering.
Tracking pins encased in rubber.
Springs (not pivot pin) absorb shock. Spring action reduces frame lift.

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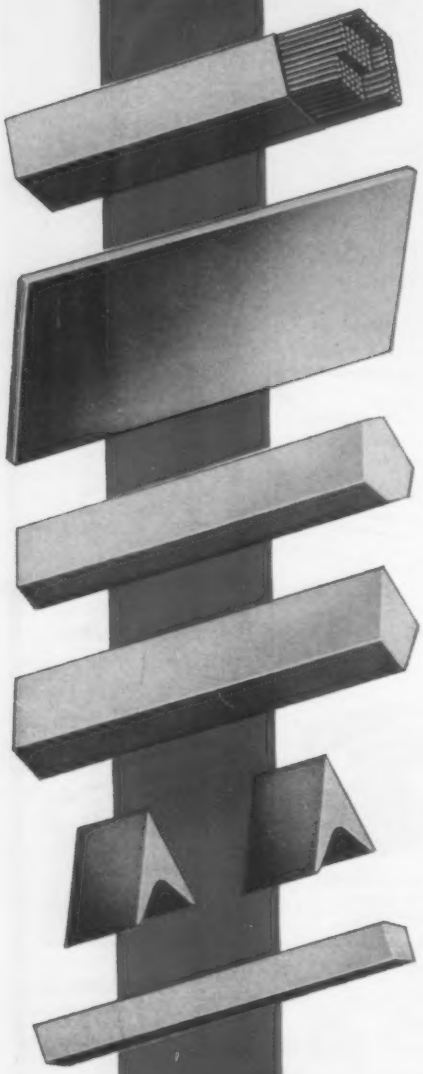

◀ **WELDING RODS** — TIMANG-NICKEL MANGANESE for build-up, joining and repair of manganese steel. Has same manganese content, work harden-ability and wear resistance as cast manganese.

TIMALLOY composite type rod for joining manganese and carbon steel. Also an excellent rod for build-up and repair of manganese castings.

◀ **HOT ROLLED PLATES** — TIMANG-NICKEL MANGANESE for chute liners, dump truck beds, rock and ore hauling trailer bottoms, dragline buckets, rebuilding power dippers, and fabricating new parts. Plates supplied as rolled (not annealed).

◀ **SPECIAL SHAPES** — HOT ROLLED TRACTOR GROUSER BARS for repair of tractor treads. Timang bars in mill lengths up to 20 feet. High carbon bars in lengths of 10 feet — cut to size required.

◀ **WEDGE BARS** — For shovel tooth build-up. The hot-rolled manganese-nickel steel bars can be supplied in mill lengths up to 20 feet, but normally are furnished in 36 inch lengths.

◀ **TOOTH REPOINTERS** — Weld on cast manganese or alloy steel repointers for rebuilding worn dipper teeth — various shapes and sizes available on request.

◀ **APPLICATOR BARS** — Hot rolled rounds, squares, and flats available in mill lengths up to 20 feet or cut to required length.

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● These riding ring kiln sections, destined for the Atlantic Cement Company, Inc., Ravena, N. Y., produced a trucking spectacular as they were transported from Allis-Chalmers West Allis, Wis., Works to Milwaukee's port for barge shipment on the Great Lakes.

Twelve sections, ranging in inside diameter from 17 to 20 ft. and from 16 to 18 ft. high, will comprise two 580-ft. wet-process rotary kilns for installation at Atlantic Cement. Average weight of each section was about 75 tons.

The $64,000,000 Atlantic Cement plant is scheduled for completion in 1962. Each kiln will be capable of producing 5,000,000 bbl. of cement a year, largest wet-process producing capacity in the United States.

N.B.C.A. Research Reports Highlight Midyear Meeting

The first reports to emanate from separate research studies of the allowable moisture in hot-mix bituminous paving mixtures and improved riding quality have been released by the National Bituminous Concrete Association, following its recent fifth annual midyear work and business meeting at French Lick, Ind.

These two studies are a part of N.B.C.A.'s national research effort, designed to promote the building of even higher quality bituminous pavements. Overall, there are ten major points in the program, covering every phase of bituminous pavement construction.

Already completed or now underway as part of the $1.3 million program, are studies of asphalt cement, raveling of asphaltic concrete, rheological properties of bituminous concrete, effect of aggregate coating on hardening of asphalt cement, merit systems to stimulate quality of workmanship, a design guide for heavy-duty bituminous concrete pavements, and a survey and coding on IBM cards of all available literature in the bituminous concrete paving field.

The first scholarships to be awarded under the N.B.C.A.'s 1½-year old Quality Improvement Program were announced following the meeting.

N.B.C.A. President Fritz Leffingwell told the nearly 200 members, their wives, and guests attending the session that arrangements have been completed with the Massachusetts Institute of Technology and Ohio State University to underwrite fellowships in bituminous concrete research.

Next year's midyear meeting will be held July 15-18 in Seattle, Wash., during that city's 1962 World's Fair, the first to be held in the United States since 1939. The national convention will be held in February, in Las Vegas, Nev.

Florida Phosphate Firms Implement Big Programs Of Land Reclamation

In years past a mined-out phosphate property in Florida was usually left as an eyesore on the landscape —a wilderness of gouged out holes, dry or water-filled. Today all this has been changed. Eight individual phosphate processors, joining forces in the Florida Phosphate Council, are working to bring worked-out land into use as golf courses, parks, housing developments, or tracts for general farming or timber raising.

The need for reclaimed land has been spurred by the tremendous population boom in the Bartow, Lakeland, and Mulberry areas, each of which has experienced a growth of 30 percent in the last ten years. Near Lakeland the American Agricultural Chemical Company, Pierce, Fla., has begun a land reclamation program in which 25,000 acres have been planted to slash and longleaf pine, and more planting is to be done. This firm and many other Florida industries co-operate with the Florida Forest Industries.

Also in the Lakeland area, the Davison Chemical Division of W. R. Grace & Company sold about 700 acres of reclaimed land for a housing development after filling the pits and compacting the soil.

International Minerals & Chemical Corporation has set up a program for reclamation of its properties, to be used for real estate development, citrus groves, farms, timberland, and recreation sites. A pit converted into a park for employees was later opened to the public.

In 1950 the Virginia-Carolina Chemical Company donated 130 acres to the city of Bartow for a public park, which is expected to become a tourist attraction when its phosphate museum is opened.

An unusual conversion was made by the Coronet Phosphate Company (subsidiary of Smith, Douglass Company), which co-operated with state wild-life agencies in transforming a cypress swamp adjacent to its operation into a bird sanctuary. Another such sanctuary has been established by Armour & Company, in co-operation with the Audubon Society.

GARDNER-DENVER'S NEW ROTA-SCREW PORTABLES ARE TAKING OVER FROM COAST TO COAST

Gardner-Denver Rota-Screw compressor capacities: 900, 600, 125 cfm. For full details, write for Bulletin SP-1.

IN THE ROCKIES: New SP600 Rota-Screw portables and swing-boom "Air-Trac" drill building access road to Round Butte Dam site near Madria, Oregon.

EAST COAST: Battery of SP600 Rota-Screw portables and swing boom "Air-Trac"® drills on super highway in Virginia.

MIDWEST: A new Gardner-Denver SP600 Rota-Screw portable powering "Air-Trac" drill in an Indiana stone quarry.

1. NO WEARING PARTS IN COMPRESSION CHAMBER
2. INSTANT COMPRESSED AIR. AUTOMATIC BLOWDOWN
3. AVAILABLE NOW IN THE SIZES YOU NEED

WEST COAST: SP600 Rota-Screw portable teams up with a swing boom "Air-Trac" drill on access road to logging camp near Portland, Oregon.

THERE'S A NEW ROTA-SCREW PORTABLE OPERATING IN YOUR AREA TOO!

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

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Best Year Ever Predicted For 1962 Construction By Dodge Corporation

Construction will enjoy its best year in history and set a new record for the 17th consecutive year, according to F. W. Dodge Corporation's Construction Outlook for 1962.

Dodge's annual outlook statement predicts that total construction contracts in 1962 will amount to nearly $40 billion, a gain of 7 percent over the estimated $37.3 billion for this year.

The Dodge outlook points out that residential building will register its best year in recent years and that dollar volume of residential contracts will total $17.5 billion, up 10 percent over 1961. Residential floor area is expected to increase 8 percent over 1961.

Nonfarm Housing — Using the Census Bureau basis of measurement, Dodge expects new nonfarm housing starts in 1962 to total 1,400,000, up 8 percent from 1961.

Nonresidential—According to the Dodge report, nonresidential building contracts will register a 4 percent increase in 1962, totaling $12.7 billion. Floor area represented by these contracts is expected to rise 3 percent, primarily because of a 10 percent jump in manufacturing buildings. Floor area of commercial buildings is expected to equal the 1961 total, while the physical volume of educational and science buildings is forecast to increase 2 percent. With the exception of hospitals, which are predicted to slip just below the 1961 level, all other building types in the nonresidential category will register small gains in 1962.

Heavy Engineering—The Dodge outlook forecasts a 6 percent increase in heavy engineering contracts in 1962, reaching a total of $9.7 billion. It is anticipated that gains will be made in both public works and utilities classifications of the heavy engineering category.

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MODEL 400-251 WATER HEATER

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Early Release of Highway Funds Permits Planning and Work

Funds were released in August for the second quarter of fiscal year 1962 for use as Federal-Aid Highway allocations. They were not scheduled for release until October 1, but President Kennedy, for the fifth time, released highway funds ahead of schedule.

The move will permit those states which are prepared to further expedite planning and construction work on ABC and Interstate Highways.

Test runs have been started by a new California industry, Sierra Asbestos, at its mill near Rawhide, Calif. Asbestos ore mined at the site will undergo primary processing at the mill and will subsequently be shipped to Los Angeles for refining.

A $3,000,000 plant will be erected by Western Gypsum Products in the Toronto, Ont., area for the production of plaster, lath, and wallboard.

Enter 49 on card, page 149 ➔

only one moving part makes dependable percussion drilling power

The piston is the only moving part, which means less wear and less trouble. No complicated valving to sand up as in many bottom hole pneumatic impact tools. You can easily change the choke which adjusts the Hammerdril to the air volume needed from your 100 psi compressor. The Series 100 Hammerdril® is an air miser, too. All the air goes through the Hammerbit® to clean or to drill. None is wasted. This splined, one piece Hammerbit has heavy tungsten-carbide inserts for long life. Service is available in your area. Write for new bulletin.

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engine power
BY CATERPILLAR

Here's a new profitable combination

Caterpillar-powered Gardner-Denver "Rota-Screw" portable air compressors reduce maintenance to lowest costs ever

Here is a major breakthrough in performance which means new low costs to users of compressed air. Gone are rotary blades or pistons. A helical "Rota-Screw" now eliminates blade chatter, vibration and whine. Quietness, pulsation-free air and minimum maintenance are the results.

Gardner-Denver's new SP900, a 900 CFM machine, is powered, as standard equipment, by the Cat D343 Diesel Engine. The SP600, a 600 CFM machine, is standard with the Cat D333 Diesel Engine. You get four-cycle design with full-stroke efficiency, plus full-length, watercooled cylinder liners for efficient cooling. Aluminum alloy pistons give low reciprocating weight, valve rotators distribute valve face wear and low-friction aluminum alloy bearings are known for superior strength and load carrying ability.

You'll like the Cat-powered Gardner-Denver line for the Caterpillar fuel system that provides "constant power" with *no* adjustments. Low-cost, high BTU fuels, such as household furnace oil, can be used instead of premium-cost No. 1 diesel fuel. Single orifice injectors and precombustion chamber design prevent fouling, even during long periods of idling between air demands. Electric glow plugs and ether starting arrangement are standard for quick, sure starts at below zero temperatures. Compressors are tested for a temperature range of —40° F. to 115° F.

Compressor service is available through a world-wide network of Gardner-Denver service points. In the U. S. alone there are over 5100 Caterpillar Dealer field service trucks on 24-hour-a-day call for engine service.

For more information on this new concept in compressors, write to the Gardner-Denver Company, Quincy, Illinois. Your nearby Caterpillar Dealer can tell you more about Cat Diesel and Natural Gas Engine Power for every application requiring from 50 to 950 HP, or write to Department 516, Engine Division, Caterpillar Tractor Co.

CATERPILLAR

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Engine Division, Caterpillar Tractor Co., Peoria, Ill., U. S. A.

Industry Personalities

W. O. Lawrence

W. Owen Lawrence was recently promoted to the position of vice-president, manufacturing, for Universal Atlas Cement Division of U.S. Steel Corp. Formerly, he was assistant vice-president assigned to direct and co-ordinate the purchasing, raw materials and manufacturing research, quality and technical services, and the research laboratories of the division.

Rexford P. Oleson has been named manager of the National Gypsum Company's dealer sales district in Los Angeles, Calif. Mr. Oleson was previously manager of the company's Omaha sales district.

George H. Emmitt, previously manager of the Los Angeles dealer sales district, has been named manager of the new western commercial trade sales district, with headquarters in Los Angeles.

Mace T. Coleman has been promoted to the post of manager of the new San Francisco dealer sales district. Mr. Coleman was formerly assistant manager of the Cincinnati sales district.

Raymond A. Roncari, vice-president of Roncari Industries, Windsor Locks, Conn., producers of sand and gravel, crushed gravel and trap rock, and ready-mix, has been elected legislative chairman of the National Association of Credit Management, Northern Connecticut Division.

Lawrence LaValley was recently promoted to the position of superintendent of Huron Portland Cement Company's St. Joseph, Mich., distributing plant.

W. Trent Ragland Jr., of the American-Marietta Company, has been elected one of nine members on the consolidated board of the Martin-Marietta Corp. The latter corporation resulted from a consolidation of the American-Marietta Company, Chicago, and the Martin Company, Baltimore, Md.

Mr. Ragland, president of the Superior Stone Company in Raleigh, N. C., stressed that Superior, a producer of crushed stone, will continue to operate as before.

V. G. Aubry Jr.

Victor G. Aubry Jr. has been promoted to the position of vice-president and general manager of Houdaille Construction Materials, Inc. He was formerly the company's general sales manager, the position which Fred C. Lynn has assumed.

Patrick H. Hoy, president, Material Service Division of General Dynamics Corporation and senior vice-president of General Dynamics, has been named a director of Illinois Capital Investment Corporation, a small-business investment company with headquarters in Chicago.

Bill L. Bryant has been named new engineer-director of the Florida Limerock Institute, Inc., Ocala, Fla., succeeding E. A. Logan, who has returned to the Georgia State Road Department at St. Simons Island, Ga.

James F. Collins has been appointed assistant director of personnel services of Universal Atlas Cement Division, U. S. Steel Corp.

Freeport Sulphur Company recently made a number of top-level management changes:

Charles A. Wright has become vice-chairman of the board.

Robert C. Hills has been elected president, succeeding Mr. Wright.

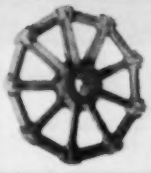
Richard C. Wells and Thomas R. Vaughan have been elected members of the board of directors. Mr. Wells and Mr. Vaughan retain their present positions — executive vice-president, and vice-president and general counsel, respectively.

A. J. Anderson has been retained as vice-president in charge of a new special products division of the Wesco Materials Corp., Dallas, Tex. Mr. Anderson, widely known professional mechanical engineer, specializing in design, construction, and operation of cement plants for more than 20 years, is a former executive vice-president and general manager of the Lake Ontario Portland Cement Co. Ltd., Toronto, Ont.

SAVE up to 40% ON SHOVEL

AND UNDERCARRIAGE REPLACEMENT PARTS FOR ALL MAKE AND MODEL CRAWLER EQUIPMENT

O.E.M. Equal Guarantee Certified Analysis



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53 GERARD ST., BOSTON 19, MASS.
Manufacturing both original equipment and replacement parts since 1846

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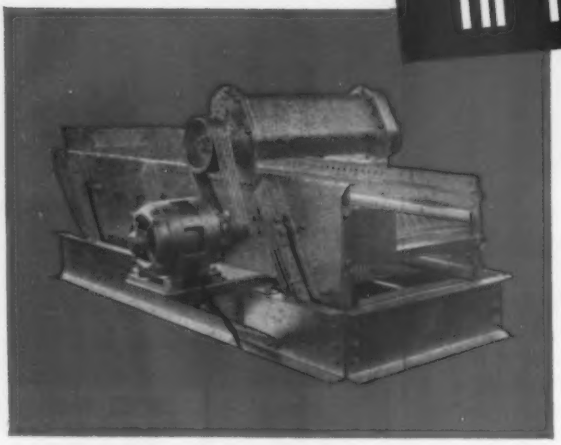
With a 24-year old profit-maker like the

CEDARAPIDS HORIZONTAL VIBRATING SCREEN

We don't change the design...we improve it!

Twenty-four years ago, Cedarapids came up with a winner . . . a *horizontal* vibrating screen designed to replace the crude inclined and revolving screens of the day with higher capacities, more accurate gradation and longer life. This design was so successful and so efficient that we've never changed its proven principle of operation. Today, the only change from the horizontal screen we offered the industry in 1937 is 24 years of constant improvements and refinements in the basic screen unit components to make modern Cedarapids Horizontal Vibrating Screens the standard of the industry, followed and imitated by others but never surpassed for meeting specifications with high tonnages at lowest cost.

in 1937...



Here is one of the first Cedarapids Horizontal Vibrating Screens ever made. It looks almost like the modern, highly refined model shown above. The only difference between these "look-alikes" are the hundreds of engineering refinements and improvements in manufacturing methods that have been incorporated in the basic design over the years. And today, Cedarapids offers these modern, improved profit-makers in 10 sizes ...in single, double and triple deck models; with a variety of screen deck arrangements or special ball-deck fine mesh styles; with or without washing attachments . . . to meet your screening requirements profitably. Your Cedarapids Dealer can help you select the model and style you need. Call him today.

IOWA MANUFACTURING COMPANY
Cedarapids, Iowa

Gentlemen: Please send Bulletin CS-6 which contains the newest developments and improvements in Cedarapids horizontal vibrating screens.

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Company_____

Address_____

City_____ State_____

Find out why Cedarapids' continual engineering research gives you the world's most efficient screen

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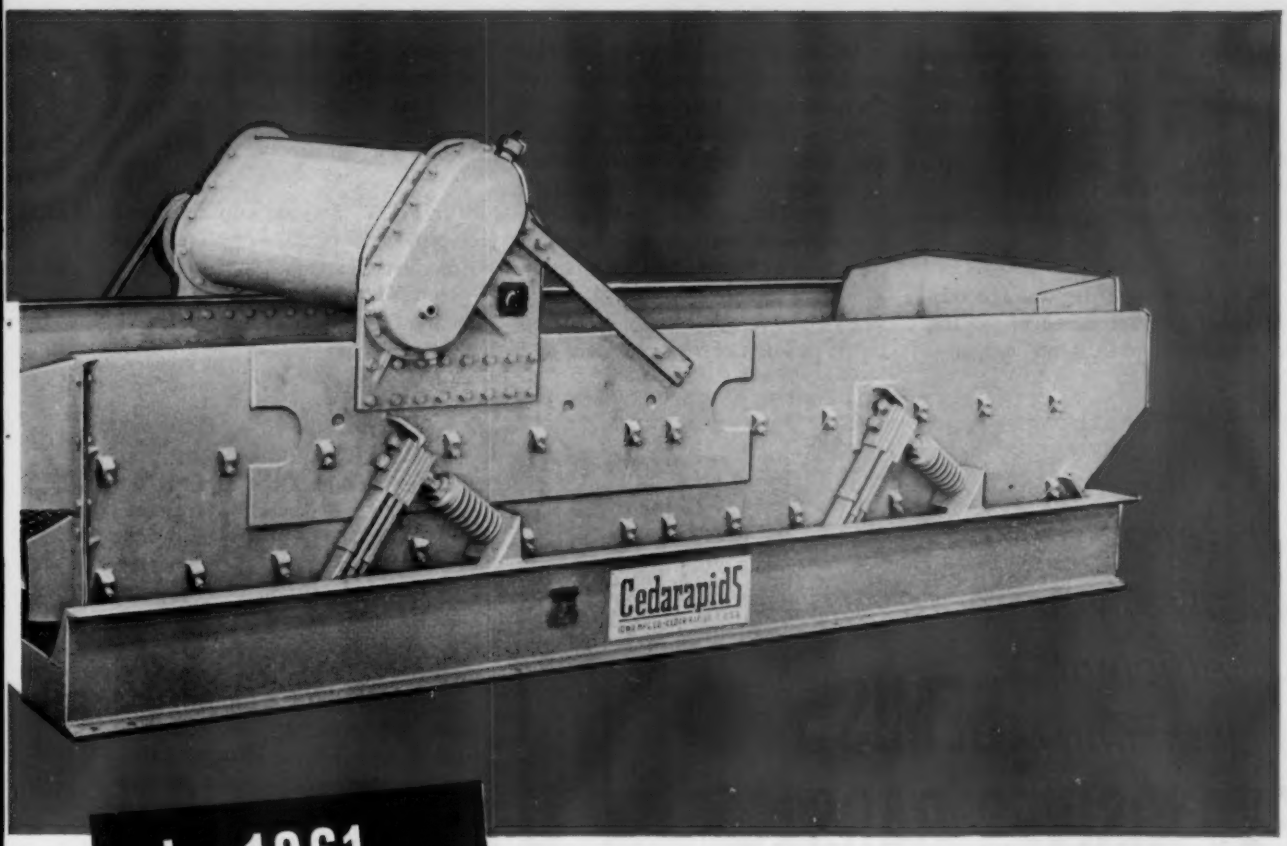
S1761H



in 1961...

These are a few of the many improvements and refinements which have been engineered into Cedarapids Horizontal Vibrating Screens in recent years . . .

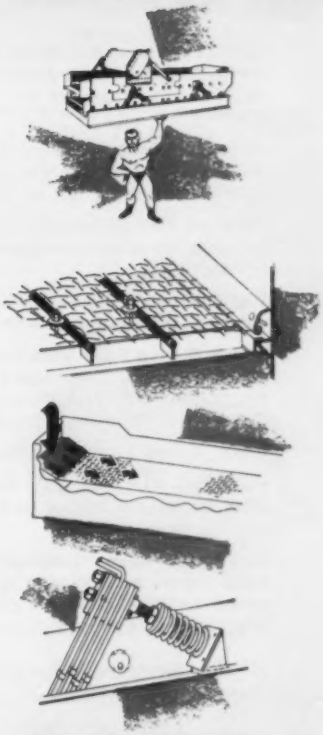
STRONGER, LIGHTER, BALANCED SCREEN BOX—Fully stress-relieved weldments on screen boxes and screen cloth support frames give Cedarapids screens 2 to 5 times greater strength and longer life than non-heat-treated units. All-welded construction eliminates the need for rivets. Boxes are built in fixtures, under precision quality control standards, to assure the perfect squareness that holds cloth tight and at even tension.

SCREEN WIRE TIGHTLY MOUNTED, EASILY CHANGED—Crowned frames allow the Cedarapids-built Ioweave screen cloth to be stretched tight against the special rubber deck mat and prevent pounding of the cloth against the frame. Clamp bars hold the screen cloth tight and also make changing of the cloth fast and easy.

FEED BOX ABSORBS SHOCK, INCREASES SCREEN LIFE—Cedarapids' correctly designed spreader feed box absorbs the shock of dumped rock and distributes the material evenly over the full width of the screen. Spreading of material quickly removes fines in the first few feet of screen area. Screening capacity is increased as cloth wear is reduced.

VIBRATING DRIVE UNIT IMPROVED AND REFINED—Heart of the efficient action of Cedarapids Horizontal Vibrating Screens is the refined vibrating drive mechanism. Timing gears run in oil to assure maximum life. Shafts have been improved through new and better manufacturing methods.

MOST EFFICIENT SPRINGS FOR LIVELY, SNAPPY ACTION — Cedarapids leaf springs assure sharp, vigorous action over the full length of the screen. There is no air cushioning to soften the "snap." Leaf springs are not affected by temperature, so no adjustments are necessary for temperature changes.



Cedarapids

Built by IOWA

IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa

ELMER C. MARTIN has been appointed assistant to the president, Universal Atlas Cement Division, U. S. Steel Corporation, succeeding Mac Hull, who has retired. Mr. Martin will retain his position of director, commercial research.

N. J. RICHMOND JR. was recently appointed general manager of the Arizona Portland Cement Company.

HARRY H. HAAS has been elected president and general manager of Duval-Wright Engineering Company, a division of R. H. Wright, Inc., which in turn is a wholly owned subsidiary of Houdaille Industries, Inc. Mr. Haas, before being elected to his present position, was the vice-president of Houdaille Construction Materials, Inc.

L. E. DAVIS has been promoted to the position of vice-president and assistant general manager; CHARLES M. BISCHOFF has been promoted to the post of comptroller and office manager of Duval-Wright.

JOHN W. SWEETLAND has been elected to the position of secretary of American Cement Corporation. Mr. Sweetland, who has been serving as assistant to the president, will continue in that post in addition to assuming his new duties.

Tailor-made to give you more efficient blasting! **BEMIS EXPLOSIVES BAGS**

Bemis Explosives Bags for ammonium nitrate and nitro-carbo-nitrate are tailor-made to your requirements—to give you more efficient blasting.

More economical: Use of Bemis Explosives Bags and ammonium nitrate mixtures can save up to 50 percent on explosives costs.

Easy to fill: Bemis provides technical assistance, manufactures equipment to speed up bag filling.

Wet hole or dry hole . . . you'll get top efficiency at minimum cost with . . .

Bemis Burlap Bags with heavy-duty polyethylene liners. The rugged burlap absorbs the punishment of handling or jagged holes. Poly liner provides waterproofness.

Other Bemis Explosives Bags:

Flexiply® Bag with poly liner. Here three plies of rugged creped wet-strength kraft provide the toughness.

Laminated Bags. Constructions of burlap, kraft paper, polyethylene and pliofilm—in varied combinations—are all performing satisfactorily in the pits and on construction sites.

Write today for sample bags and additional information on Bemis Explosives Bags.

Bemis

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JOHANNES WAANDERS, a native of The Netherlands, was recently appointed to the position of research project engineer for the Louisville Cement Company, Louisville, Ky. He was formerly associated with Chem Lime, Inc., Elizabeth, N. J.

LEONARD C. ROSE, formerly executive vice-president of Colorado Fuel & Iron Corp., Denver, Colo., has been promoted to the position of president. He succeeds ALWIN F. FRANZ, who was named chairman.

WILLIAM E. WILLIAMS has been elected vice-president of the Becker County Sand & Gravel Company, Inc., Crosby, Minn., effective October 1. He was formerly assistant secretary and sales manager of the firm.

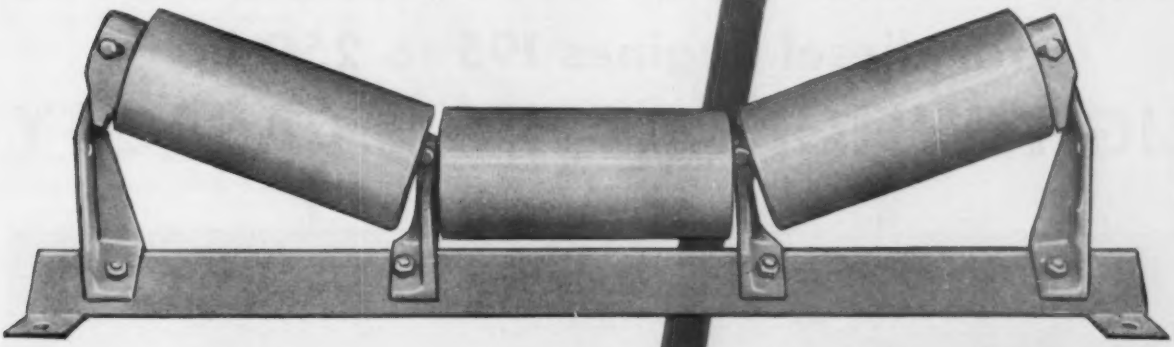
D. R. B. MCARTHUR has been promoted to the position of executive vice-president from that of vice-president and secretary-treasurer for the Inland Cement Company Limited.

JOSEPH N. KEMPLE has been elected executive vice-president, marketing and operations, of Warner Company. He has also been elected to the board of directors, and to the executive committee.

JOHN HOWARD MALLON, senior vice-president of the Louisville Cement Company, Louisville, Ky., will retire in 1961 after serving the company for 41 years. He has written a number of handbooks on the proper use of masonry cement.

There's NO BETTER TIME to overhaul your conveyor system

BELTING



NOW, when work is beginning to slack off, is the time to overhaul, replace and repair your conveyor system.

NOW, before it's too late and you get caught in a spring rush.

NOW, when parts are on your dealer's shelves and you don't have to wait as much as a few days for delivery.

Your CEDARAPIDS dealer has a full line of conveyor system parts for immediate delivery including:

1. Heavy duty troughing rolls (shown above) with Life-Seal bearings that don't clog up and never need lubrication.

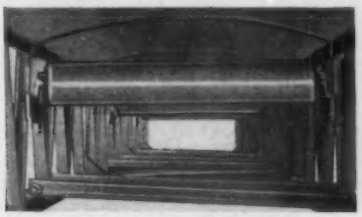
2. Head pulleys with Safety Grip Lagging to reduce slippage and increase traction.

3. Return rolls of heavy gauge seamless steel tubing with crimped ends that won't damage the belt.

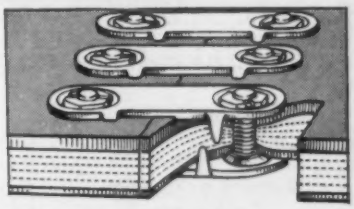
4. Head end belt wipers to clean the conveyor belt and prevent material build-up on return rolls.

5. Conveyor belting and fasteners specially designed for rugged work.

These are just a few of the many items available for conveyor system overhaul and repair. Bulletin CON-2 describes the full line and a copy is yours for the asking.

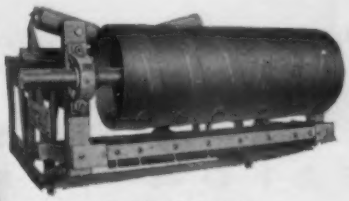


RETURN ROLLS



FASTENERS

HEAD PULLEY



BELT WIPERS

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa

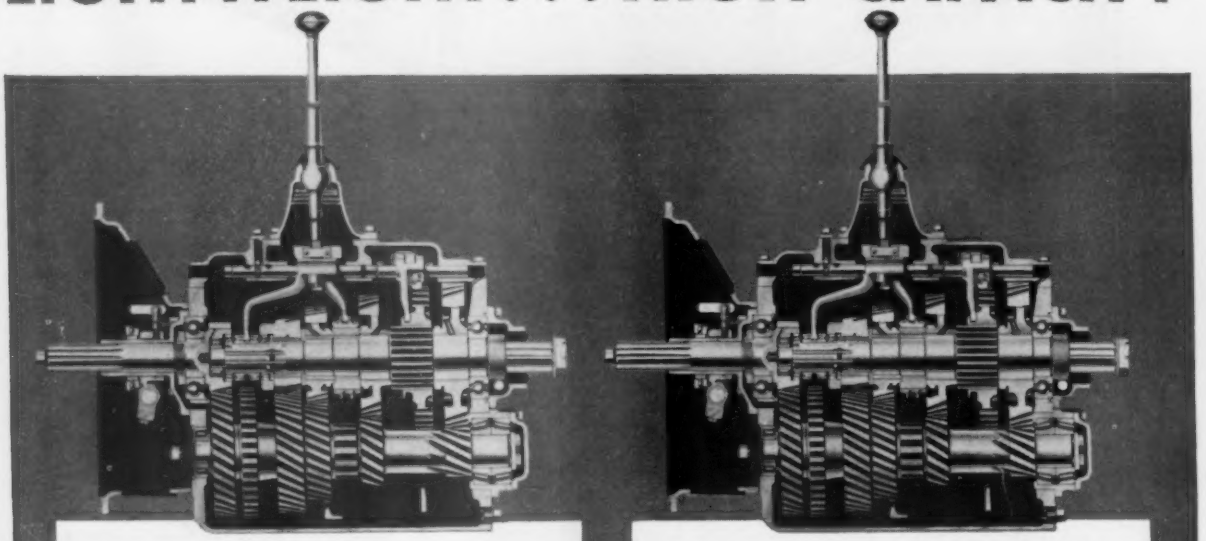
Cedarapids
Built by IOWA

P-2061-N

NEW FULLER 5-SPEED TRANSMISSIONS

for diesel engines 195 to 250 hp

LIGHTWEIGHT . . . HIGH CAPACITY



Model 5-H-74 and 5-HA-74

designed for use with 2-speed auxiliaries, 3-speed auxiliaries, 2-speed axles.

GEAR RATIOS:	
5th	1.00
4th	1.17
3rd	1.98
2nd	3.61
1st	6.60
Rev	6.51

Model 5-HA-74—93 lbs. lighter with aluminum case and clutch housing.

Model 5-H-75 and 5-HA-75

designed for use with Fuller 4-C-75 4-speed auxiliaries and 3-speed tandem axles.

GEAR RATIOS:	
5th	1.00
4th	1.56
3rd	2.43
2nd	3.91
1st	6.60
Rev	6.51

Model 5-HA-75—95 lbs. lighter with aluminum case and clutch housing.

- Extremely high capacity-to-weight ratio
- Ideal gear ratios
- Wide gear faces
- Mainshafts of greater diameter
- High-capacity pilot bearings
- Helical gearing
- Jaw clutch engaged—for easy shifting

For maximum versatility and reliability in your operation, Specify the Model . . . SPECIFY

FULLER TRANSMISSION DIVISION

EATON MANUFACTURING COMPANY

KALAMAZOO, MICHIGAN

Sales & Service: West. Dist. Branch, Oakland 6, Cal. • Southwest Dist. Office, Tulsa 3, Okla. • Automotive Products Co., Ltd., Brock House, Langham St., London W.1, England, European Rep.

PETER BLACK and ARTHUR W. GILBART have been elected vice-presidents of the Freeport Sulphur Company. Mr. Black joined Freeport in 1953; Mr. Gilbart, in 1957.

WILMER H. KINGSFORD has been promoted from the post of assistant to the chairman of the board to the position of assistant vice-president. He has been with Freeport since 1957.

Two executive appointments for the newly formed Atlantic Cement Company, Inc., were recently announced:

SAM WEBB JR., elected to the post of vice-president, operations, will be

Sam Webb Jr.

H. T. McBride

responsible for production of raw materials and control of manufacturing operations and distribution facilities. He was formerly affiliated with Marquette Cement Manufacturing Co., Inc.

H. T. MCBRIDE has been appointed to the position of treasurer. Mr. McBride had been with the Bechtel Corporation for the last 18 years.

EDWARD A. FRENTZ retired recently as plant superintendent of the Summit, N. J., operations of Houdaille Construction Materials, Inc. Mr. Frentz had been working at the same location for over 48 years. JOSEPH E. TRUPPI succeeds Mr. Frentz as plant superintendent.

ROGER E. GAY, former president of the Bristol Brass Corporation, will succeed Vice Admiral George F. Hussey Jr., U.S.N. (ret.), as managing director of the American Standards Association, effective January, 1962.

Mr. Gay is leaving his manage-

How to plan for profits in your purchasing picture...

BUILD A TASK FORCE OF SCHRAMM CO-ORDINATED AIR POWER

With SCHRAMM air-power equipment, one good buy leads to another. That's because SCHRAMM equipment not only does more work, but each unit works together with another . . . complementing, not duplicating, its functions. Fewer pieces of equipment to buy and maintain, fewer men to operate them. That's why it makes sense, as you save dollars, to build towards a SCHRAMM task force of co-ordinated air-power equipment.

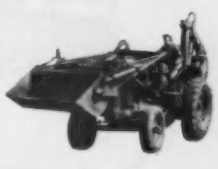
Your basic buy is the SCHRAMM ROTADRILL . . . a rig that can save you up to one-third of your total drilling costs. Whether truck, tractor or crawler mounted, ROTADRILL is modern, compact, highly mobile. Ideal for rock removal, you'll find this rig a fast driller, efficient . . . spends more time at work. It furnishes its own air for chip removal, dewatering and blockage breaking. One man operates ROTADRILL through the entire drilling cycle.

This is just a hint of what is offered by the only truly complete line in the industry . . . Portable, Stationary, Self-propelled compressors, Rotary Drill Rigs, Hi-Pressure and Booster compressors, Air Tools. Talk to your SCHRAMM dealer, or write direct for full information on saving with task forces of SCHRAMM co-ordinated air-power equipment. SCHRAMM, Inc., 640 North Garfield Avenue, West Chester, Pa.

SCHRAMM
CO-ORDINATED AIR POWER

Rotadrill **Rotary Drill Rigs** cost less too. With fast chip removal . . . top operating, drilling speeds. New Series "H" Hi-Pressure Rotadrills for extremely hard-rock conditions.

Portable Compressors save you up to 35% initial cost on 125 cfm compressors, comparable savings on every size from 20 cfm to 600. You also save 15 to 50% fuel consumption.



Pneumatractor **Self-propelled Compressors** cost less than comparable compressors and tractors combined! PNEUMATRACTORS drive along with the work. No trucks, crews, tied up.

Enter 57 on card, page 149

ment consultant practice to become the third managing director of the 43-year-old voluntary national standards body. President of A.S.A. from 1952-1954 and a member of its board of directors for nine years, he joined the A.S.A. staff on November 1.

JEFF D. COLLINS has been appointed vice-president and director of sulphur sales for Jefferson Lake Sulphur Co., and BRADLEE V. POSTELL has been named vice-president and director of corporate development and expansion.

RONALD D. COMB has been appointed technical director of Minnesota Mining and Manufacturing Company's roofing granule division. Mr. Comb joined 3M in 1947; he was named division engineer for roofing granules in 1951, and in 1957 was promoted to assistant manufacturing manager.

Obituaries

PEARSON E. NEAMAN, 57, chairman of the executive committee and a director of Freeport Sulphur Company, died recently in a New York hospital. He had been with Freeport and various affiliated companies since 1930, and during that time he had been an officer of the firm and until recently its general counsel. Until his resignation recently he was a member of the Mayor's Commission on Intergroup Relations in New York City, and during World War II he served as an industry member on various War Labor Board panels.

FRED D. WITMER, general manager of Ohio Lime Company, Woodville, Ohio, died recently after a long illness. He had been active in the affairs of the National Lime Association for many years and had served as program chairman of several operating meetings.

JAMES D. MARSHALL, executive director of the Associated General Contractors of America, died recently in Washington, D. C. He was 74 years old. Mr. Marshall represented the A.G.C. or the construction industry on many committees and special groups in private business organizations and in the Federal Government.

FRANK E. WELDON SR., 81, an officer and co-owner of the Fanwood Stone Crushing and Quarry Company, Westfield, N. J., died recently in Fanwood, N. J.

RAYMOND H. HENDERSON, 60, owner of the Henderson Sand and Gravel Company, Honesdale, Pa., died on October 18.

FRANK L. MOORE, 86, vice-president of Pacific Rock & Gravel Company, Arcadia, Calif., died early in October.

YOU CAN TAKE IT WITH YOU

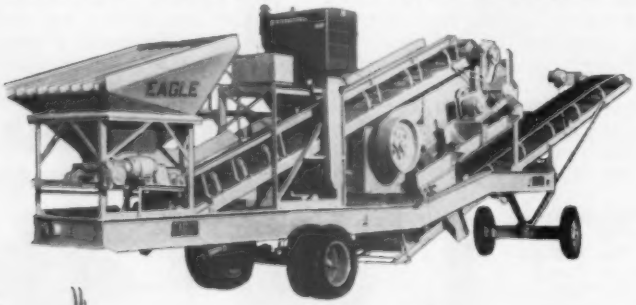
EAGLE'S MODEL 6600 PORTABLE JAW CRUSHER

Nearly every contractor knows that to build today's rapidly developing road system it's important to have **portable** crushing equipment.

Eagle builds a variety of crusher plants to help you get your share of this important business. One of these plants is shown below. This single pass gravel plant has a low hopper for front end loaders. The plant is available in four crusher sizes . . . capacities from 40 yds. per hour on 1" material up to 220 yds. per hour on 2½" (based on crushing approximately 25% of the pit run gravel).

Two big advantages are yours when you choose an Eagle Crusher . . .

1. You get a unit known for high-efficiency and trouble-free durability.
2. You get consultation with engineers who know how to design crushing equipment to do your job exactly **right.**



Write for detailed information

EAGLE CRUSHER CO., Inc. GALION OHIO·U·S·A

JAW AND ROLL CRUSHERS, PORTABLE PLANTS, CAGE AND HAMMERMILLS, CONVEYORS, LOADERS

Enter 58 on card, page 149

What does CARSET® really mean?

Sure it's a trademark for an Ingersoll-Rand rock bit with tungsten carbide cutting edges. But...it also means years of know-how...the experience born of thousands of trials...and frustrations... and hundreds of thousands of dollars spent in searching and perfecting.

It also means selection...and rejection of more materials and shapes and sizes and what have you...than we care to talk about.

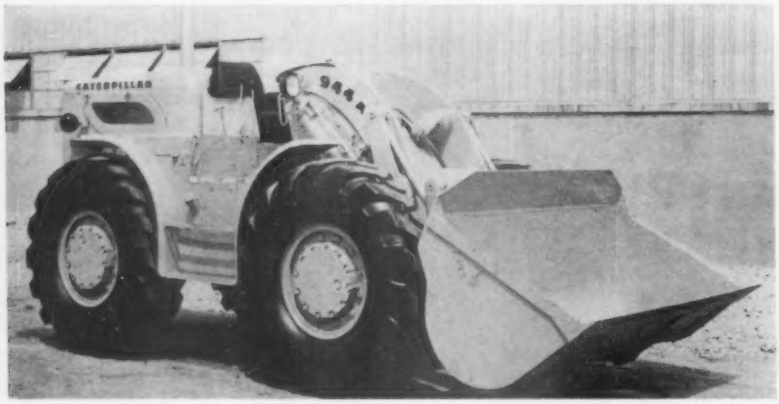
It means steadfastness, against experts from without...and from within. It also means criticism from the bargain hunters and die-hards with the do-it-yourself kits.

In short, it means we will continue to give you the best bit that know-how and money can build. If you have not already standardized on the bit that is backed by experience and everything you need for drilling rock...do it now.

A CONSTANT STANDARD
OF QUALITY
IN EVERYTHING YOU NEED
FOR DRILLING ROCK

Ingersoll-Rand®
227A5 ♥ 11 Broadway, New York 4, N. Y.

new machinery



• Nine new general application buckets (3 types of each of 3 models) are now available for Cat wheel-type loaders, according to an announcement by Caterpillar Tractor Company. The new units join six previously available (2 types for each model), raising to 15 the number of buckets now offered for the 966, 944, and 922 loaders. This variety offers loader owners the chance to closely match capacity to the material being handled.

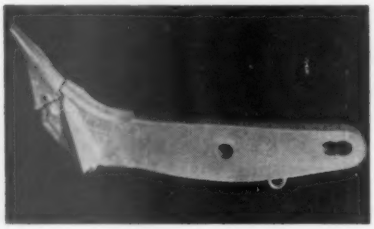
These buckets incorporate new extended cutting edges. Induction hardened, the edges are self sharpening to retain good penetration throughout their service life. Cast steel corner pieces are welded both to the cutting edge and to the bucket. These hardened corner pieces provide maximum strength to withstand heavy stresses which are concentrated on the corner of a bucket at work.

Holes for mounting bucket teeth adapters are pre-drilled in buckets of the types normally used for excavation work.

Capacities for the 922, 944, and 966 standard buckets were established to provide an optimum load of 3,000 lb./yd. material, the figure generally accepted by the industry for average material. Normal rating capacity for each machine, therefore, can be determined by multiplying the standard bucket capacity by 3,000 lb. **(350)**

• Berkeley Forge & Tool announces its "ForgAloy" ripper shanks and points are available for all makes of tractors. There are four sizes of points for different materials encountered.

The manufacturer reports the ForgAloy patented shield offers a threefold purpose: protects shank from wear, gives added ground fracture, and prevents shank ride out. All points and shanks are made of forged high alloy steels. **(351)**



• A new front-end section rebuild kit featuring design of the recently introduced International D-400 and DB-400 series of conventional heavy-duty trucks has been introduced by the motor truck division of International Harvester Company.

Rebuild kits for cab-over-engine International DCO-405 series trucks first offered in 1958 have been updated and continue to be available.

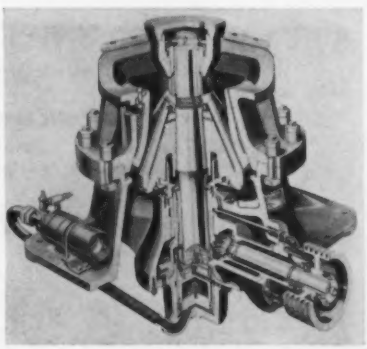
With these kits almost any make or model of heavy-duty truck using a diesel engine now available as a standard production item, in an International 400 series chassis, can be converted to a truck as modern in appearance as the newest International models.

They are offered for models from 30,000 lb. g.v.w. and 68,000 lb. g.c.w. and up, for conventional or c.o.e. chassis, and 4- or 6-wheel models. **(352)**

• Expansion of its Hydrocone crusher line with the addition of a 45-in. unit has been announced by Allis-Chalmers. The new medium size (35,300 lb.), compact (5 ft. 8 in. high) unit is for portable crushing plant service as well as permanent installations.

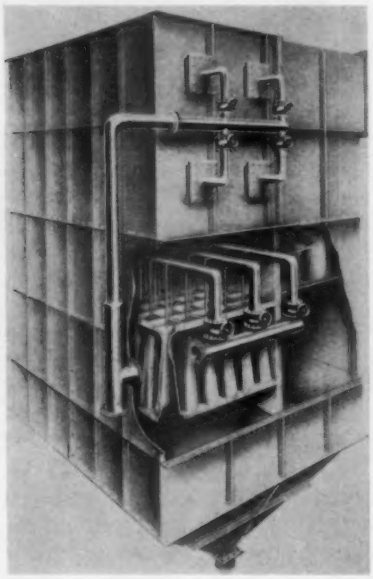
A variety of eccentric throws makes possible a selection of horsepower needed to crush tough stone with the new unit. For example, the manufacturer indicates that with a 1¼-in. throw and a 1¼-in. closed side setting, up to 200 hp. can be applied for about 250 t.p.h. capacity.

Feed openings of the new 45-in. crusher are 9 in. for the coarse chamber, 6 in. for the intermediate, and 3 in. for the fine chamber. It is equipped with the Hydroset mechanism which automatically provides for changes in product size requirements and lowers the crushing head to release tramp iron, returning the head to its original setting. This feature provides a ready means of plant automation. **(353)**



and equipment

for further information use card on page 149



● Buell Engineering Company, Inc., offers a new venturi scrubber for separating entrained solids from high-temperature gases. The unit is manufactured under an exclusive U. S. license from Waagner-Biro, Austria, and offers advantages of low pressure drop and low water requirements. Buell reports that these, in turn, result in lower power requirements and lower operating costs. Although the scrubber is new in this country, it is in use in continental Europe, Great Britain, and in Japan.

The scrubber subjects the exhaust gases to a double scrubbing action as they pass through a bank of venturis. At each venturi, a nozzle sprays a cone of water into the belled venturi entry, and the gas receives its first scrubbing as it passes through this wall of spray.

It receives its second scrubbing within the venturi as it passes through a second inverted cone formed as the water rebounds from the belled mouth into the throat of the venturi.

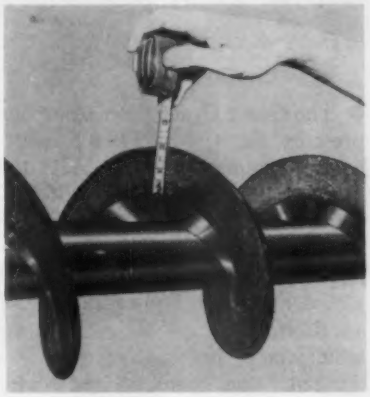
It is reported that the scrubber cleans gases of dust particles as small as 0.05 microns at efficiencies of 99 percent plus. **(354)**

● A line of screw conveyors engineered for abrasion resistance by a hard-facing alloy process for treating the carrying sides of conveyor flights has been developed by the Industrial Machinery Company, Inc.

The manufacturer reports the abrasion resistant conveyors are expected to offer a consistent 500 to 600 percent service life increase over unprotected conveyors.

The special hard-facing alloy process utilizes a chromium boride compound which is fused into the blue steel conveyor flights with an oxyacetylene flame. The manufacturer further reports that unlike many hard-surfacing methods, application of the compound is not a build-up process. Build-ups on the Industrial Machinery abrasion resistant conveyors are limited to a few thousandths of an inch, while penetration of the compound into the base metal of the conveyor is two to three times the thickness of application.

Width of application on conveyor flights is determined by the size and usage of the conveyor. The application area ranges from one in. on standard 6-in. conveyors to 3 in. on 20-in. units or full-face applications in certain instances.



These conveyors are available in individual units in all of the firm's standard conveyor models and sizes, and also are available in any of the company's materials handling equipment. **(355)**

● The N. P. Nelson Iron Works is expanding their line of Nelson four-wheel drive tractor shovels with introduction of the new Model 250D, 13,000-lb. lift-capacity machine. Nelson now offers three sizes of tractor shovels with bucket capacities ranging from 1⅝ to 4-cu. yds.

Incorporating full power-shift transmission, planetary axles, power steering, power brakes and full vision underslung type safety arms, the Model 250D has a 'Contractor' type bucket that permits a maximum dumping angle of 60-deg.

Design for ready accessibility to all components for a minimum of downtime is a feature. **(356)**

● The Grove Crane Sales Company presents the Grove TM-12 crane, a truck-mounted unit with a 12-ton capacity mounted on a 1066CX Crane Carrier chassis.

The boom telescopes hydraulically from 16 ft. to 40 ft. under load with a maximum hook clearance of 44 ft. from the ground. The turntable winch, boom operator's station, and the counterweight rotate 360 deg. continuously.

The operator's station is on the turntable to the left of the boom providing full visibility at all times. All movements of the crane unit are finger tip controlled by the hydraulic valves at the operator's station.

Special attachments such as hydraulic clam-shells, jib booms, hydraulic hammers, snow scoops, and others, to increase the efficiency and broaden the use of the machine are readily available.

These units are also available in 6-ton capacity and also may be mounted on any suitable truck chassis. **(357)**

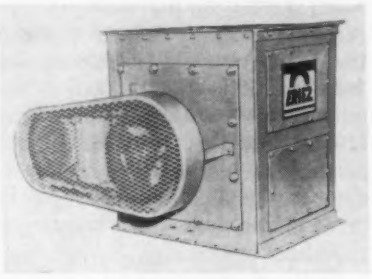
● Eriez Manufacturing Company is offering its redesigned and expanded line of permanent magnetic drum separators for eliminating tramp iron.

Eriez indicates the largest drums, 30 and 36 in. in diameter, efficiently remove all large and small iron particles from a wide variety of materials flowing at rates up to 25,600 cu. f.p.h. and that smaller size drums have been redesigned to increase their capacities up to 45 percent.

The new drum separator line includes standard models with 12 to 36-in. diameters and widths from 8 to 60 in. Other sizes available on special orders.

In addition to standard units, new heavy-duty drum separators provide a heavier shell, abrasion resistant end flanges and more rugged housings for trouble-free operation. Other construction features are: easy replacement of bearings without complete drum disassembly; quick inspection through removal of front and back inspection panels and easy removal of drums from housings without taking housings from flow lines.

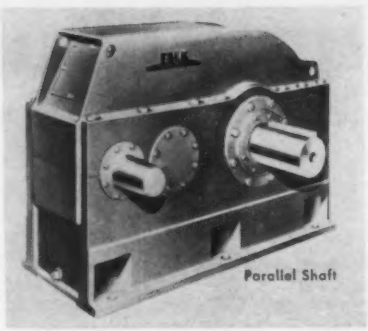
Eriez also provides a full line of magnetic drum separators without housings. Eriez Type R, a non-housed drum, has a smooth, stainless steel shell with a single wiper strip. The magnetic element is easily adjustable for efficiency under various operating conditions. **(358)**



● Euclid Automatic Machining Company is manufacturing air slack adjusters that are protected against corrosion with a special formulated coating.

The company states that every moving part of these air slack adjusters is precision machined and hardened and prior to being placed on the assembly line these parts are deep greased to assure ease of brake adjustments.

The manufacturer reports the adjusting screw is precision machined and with its positive spring type lock assures exact settings of the adjusting screw at all times. **(359)**



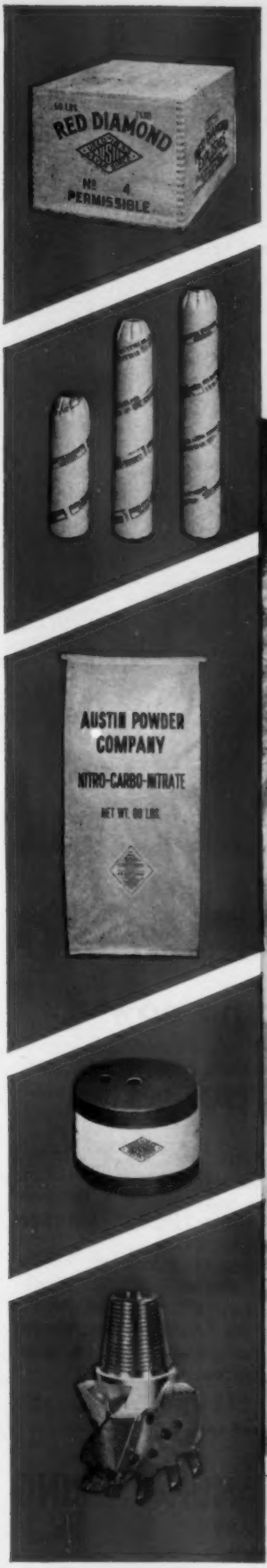
● Production of two new series of horizontal speed reducers is announced by The Falk Corporation: Parallel Shaft (Type Y) with ratios 1.84 thru 292 to 1, and Right Angle (Type YB) with ratios 5.06 thru 1207 to 1. Capacity ranges from 9,000 to 1,570,000 lb.-in. torque, in catalogued, standard units (higher in custom units) with 22 standard sizes for each type, permitting precise and economical selection.

Gears are single helical (98½ percent efficiency per gear mesh under full load) with precision cut extra-depth high pressure-angle tooth form for greater capacity and increased strength. Heavy-duty double-ended shafts can be turned 180 deg. for double gear life, and have large diameters to accommodate maximum torque and overhung loads.

Rugged housings have smooth flat surfaces for simple mounting of motor brackets, backstops, brakes, and other modifications. Continuous positive lubrication is provided, with oil tight, dust and water-proof type shaft seals. Oil check is by automotive-type dip stick. **(360)**

● A new type kiln chain developed for use in both wet and dry cement kilns has been introduced by the S. G. Taylor Chain Company, Inc. According to the manufacturer, the chain's design and construction offers improved wearing qualities and longer service as compared to conventional types now in use, plus new economies reflected in lower kiln operating costs resulting from reductions in down time.

The new chain is manufactured from carbon, stainless, and special analysis steels. No special end-links and fixtures are required for installing the chain in the kiln. **(361)**



Merry Christmas!
Happy New Year!

AUSTIN
POWDER COMPANY
CLEVELAND 13, OHIO

TRAYLOR FIRST

Biggest primary gyratory crusher in 1919 and now . . . big reason why it pays to plan with Traylor in the changing 60's

Industry seeking a crusher of capacity bigger-than-ever turned to Traylor and got it . . . 42 years ago. The 60-inch primary gyratory first built by Traylor then is still in operation—along with two others purchased since by the same customer. It is still the standard by which "big" crushers are measured.

Why so important now? One obvious reason is, no one has a longer record of experience in this special field.

Of even greater importance: It's one of many important demonstrations of Traylor's being first with new and better equipment to meet changing production needs. You'll find many other examples throughout the industry—very likely right in your own plant. Do you use an all-welded kiln . . . a large ball mill, larger copper converter? All these are Traylor "firsts," too. Traylor's proved capacity to pioneer sound innovations in kilns, mills and crushers is enhanced today by expanded research capabilities and process know-how.

An impressive record of historic "first" . . . plus what it takes to stay first for so many years . . . that's why it pays to call on Traylor first when you're planning plant improvements for bigger profits tomorrow.

See Pit & Quarry Handbook for details and specifications.

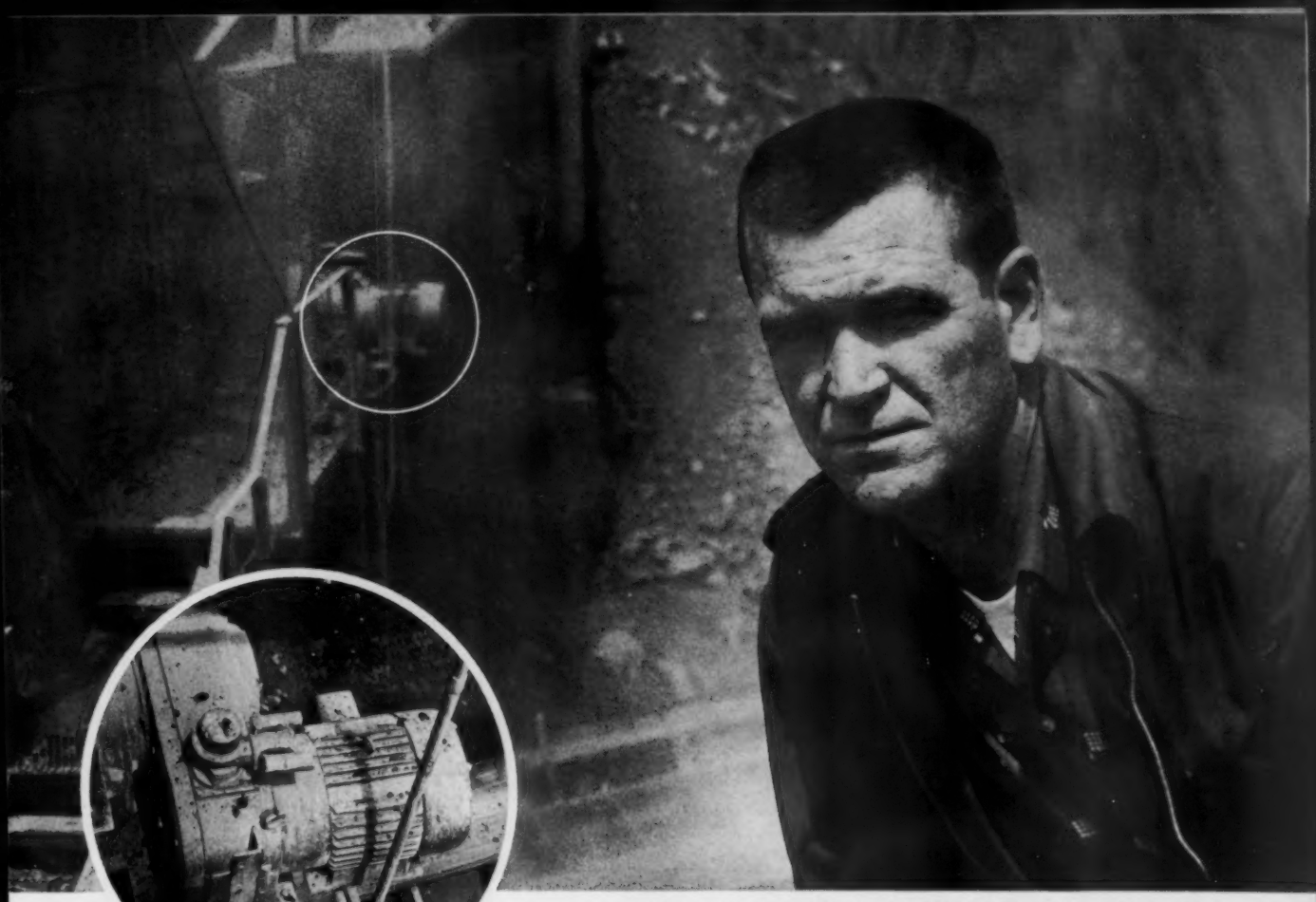
Traylor

TRAYLOR ENGINEERING & MANUFACTURING

DIVISION OF FULLER COMPANY

1556 MILL STREET • ALLENTOWN 1, PA.

4164
TCA-12



Richard Branch, superintendent at Red Rock Quarry, Nesquehoning, Pa.

"Since installation in July, 1960 . . .

Constant, Heavy Impact Hasn't Stopped Our General Electric Polydyne® Drive"

"Since we installed a General Electric Polydyne mechanical adjustable-speed drive on our Universal Wobbler Feeder, we haven't had a moment's downtime due to malfunction since July, 1960," says Richard Branch, superintendent at Red Rock Quarry, Nesquehoning, Pa.

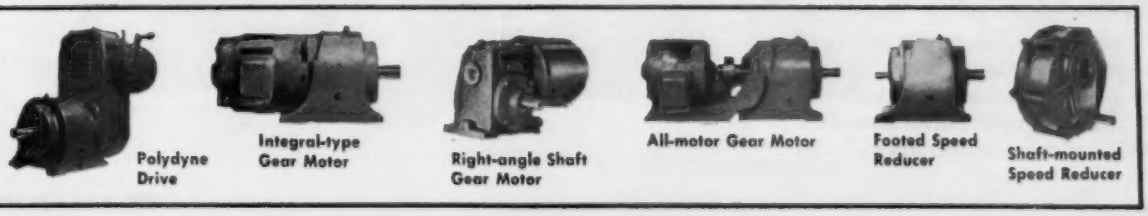
The wobbler's elliptical bars convey large rocks to a crusher and let fines and dirt drop through to another conveyor. The rock is unusually hard sandstone, which stratifies into large, thin pieces. This type of material creates a tremendous strain on the drive unit during initial impact and separation.

"THE FORMER DRIVE cost us $2,939 in maintenance and eight days' lost production during the year and a half we used it," continues Mr. Branch. "General Electric's Polydyne Drive is 15 horsepower, same capacity as the old one, but it's physically larger and much stronger. It has proved itself an excellent solution for our tough operating conditions."

When your application requires low-cost adjustable speed, reliability, and ease of maintenance, investigate General Electric Polydyne Drives. Ask your G-E Sales Engineer or write for bulletin GEA-6806, Section 854-07, General Electric Co., Schenectady 5, N. Y.

GENERAL ELECTRIC

GENERAL ELECTRIC OFFERS A COMPLETE LINE OF LOW-SPEED DRIVES, 1/8 TO 200 HP



• A new type of drill steel collar, with a hard rubber sleeve can now be attached to ⅞-in. and 1-in. steel to absorb shock and reduce breakage. The collar was developed by Le Roi Division, Westinghouse Air Brake Company, to replace the forged collar currently used with percussion type drills to hold drill steel in the chuck.

Le Roi indicated use of the rubber-lined collar reduces the initial cost of making up drill steel by eliminating the use of forging or heat treating equipment and that, with the heat treat process eliminated, alloy steel can be used for drill steel.

The rubber-lined collar is attached to the steel by the thrust from an accessory air cylinder. The surface of the steel is first prepared for bonding by sandblasting or cleaning with a solvent and wire brush. An adhesive type bonding agent is also applied to the finished surface of the steel before setting the collar.

The collar, itself, is a steel sleeve, 2 in. long and 1½ in. in dia. with rubber bonded to the inside dia. of the sleeve by a patented process. This same process is used in bonding the rubber-lined collar to the drill steel. While the collar is being attached, the drill steel is clamped in a vise in line with the air cylinder to position the collar accurately on the steel. **(362)**

• The prompt recognition of lubricating oil contamination in diesel or gasoline engines is the prime mission of the newest Gerin oil condition indicator produced by The Gerin Corporation. The engine mounted meter gives readings on condition of the oil automatically. It tests the oil at engine operation temperature instead of room temperature. It can be read while engine is stopped or running and is engineered to stay accurate under adverse conditions of weather and vibration.

With the new dial zones a man can check the dip-stick oil level and at the same time check the oil condition by a glance at the meter. When the black pointer is at 100 percent at the dial the oil is safe for continuing use. Whenever it is in one of the zones instead of at 100 percent the recommendations to be followed are printed on the face. **(363)**

• A reinforced polyethylene valve insert for steeped-end pasted valve bags has been developed by Union Bag-Camp Paper Corporation. The insert is bolstered with gummed tape which Union-Camp reports results in a tighter closure and added strength at the very point where the valve hangs on a bag filling spout.

The insert is constructed of 1½ mil seamless polyethylene tubing with a strip of 60-lb. gummed tape reinforcing the top side of the tube. It is set into the valve and attached by adhesive. **(364)**

• The latest addition to the LeTourneau-Westinghouse Haulpak truck line is the Model 65, reported to be the world's largest capacity, single rear axle, end dump truck.

The Haulpak 65, a refinement of the Model 60, incorporates most of the features of the Haulpak line. By using extra high yield strength steels, and fabricated units in construction, this truck weighs 69,850 lb. empty, which is only 54 percent of its pay load of 130,000 lb. It is powered with a Cummins VT-12-700 turbocharged engine, with transmissions available to accommodate this hp.

In designing the Model 65, LW engineers moved the cab forward and refined the frame to accommodate either a rock body or a coal body. This interchangeability of bodies, with considerably different yardage capacities and the same tonnage ratings, is the most significant single change in the new model.

The rock body (pictured) has a capacity of 42 cu. yd., struck and will haul a pay load of 65 tons. The capacity of the coal body is 66 cu. yd., struck and 65 tons. **(365)**

Enter 67 on card, page 149 →

The earth moving industry looks to

The right design, the right steel, the right shape make *ESCO* Two Piece Teeth right for every digging condition.

ESCO Corporation
PORTLAND, OREGON and DANVILLE, ILLINOIS

See reverse for shapes and size range

Here are the points to remember...

Each easy-to-change ESCO Point is Brinell tested to assure exactly the right degree of shock-absorbing toughness and abrasion-resisting hardness for longer life. Abrasion resistant Wear Caps (illustrated) extend adapter life.

12M ALLOY STEEL

ESCO 12M Two Piece Teeth are the toughest you can use. Developed through years of research for the earth moving industry, cast *ESCO* 12M is the finest steel made for severe shock and abrasion.

ESCO TWO PIECE TEETH
for all your digging equipment

Your *ESCO* dealer can supply two piece teeth for all your equipment. Consult him about standardizing on *ESCO* teeth for the added advantages of quantity purchasing and reduction of on-the-job inventories.

WEAR CAP ADAPTERS

The ESCO Wear Cap Adapter, winner of the Blue Ribbon Mining Award, is the most rugged tooth assembly ever developed for handling tough rock and taconite. Replaceable wear caps sharply increase service life by protecting the adapter from wear. No special pins or welding required.

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FOR EVERY DIGGING CONDITION

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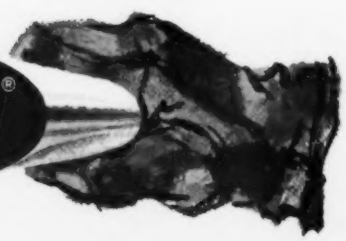

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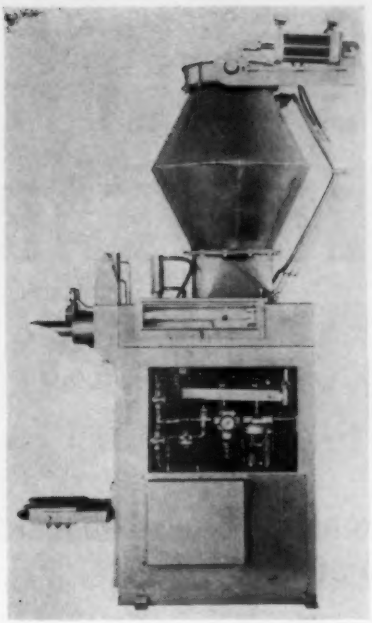


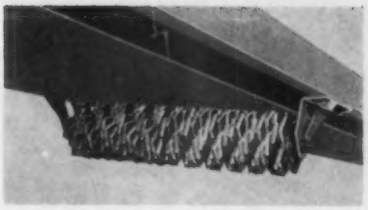
● New ease, speed, and accuracy for packers of powdery, flaky, granulated, or pelletized materials are reported to be benefits offered by the new "Stok-Aire" Model DX air-pressure packer introduced by the H. L. Stoker Company. The unit is designed for 20 to 250 lb. packed weights.

The Stok-Aire combines a space saving pressurized delivery system with an electronic weighing system for true weight accuracy. A pressure chamber is used which reduces the headroom of the unit to a maximum of 10 ft. 8 in. An optional pressure chamber allows installation with headroom of 87½ in. Floor width is 38 in.

The true-scale beam features a 100-to-1 scale leverage which provides sensitivity of as little as ¼-oz. actuation of an electronic sensing capacitor (which functions without direct connection or sparking). The under-over weight indicator and electronic trimming are said to eliminate the necessity for check weighing.

Gauges, valves, and electrical controls are easily available.

Other features are no lubrication and easy clean-out. All electrical controls are in a dust-tight enclosure. A settler is available as optional equipment. **(366)**



● A new line of Belt Saver Cleaning Idlers is announced by Webster Manufacturing, Inc. The new idler is an assemblage of resiliently deformable material mounted spirally to produce cleaning action removing granular particles from the belts.

The announcement states the idler was developed for toughest service conditions on conveyors handling wet, sticky or frozen materials. Features are: prolonged belt life, prevents return belt or roll "build-up", corrosion and temperature proof, eliminates belt crowning on return, and cleans itself while it cleans the belt.

The idlers are patented and are made in all belt widths with 6-in. dia. rolls and ¾-in. roller bearings. **(367)**

for a look at a complete line of...
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Trailmobile offers you many types of dump trailers plus an unlimited variety of optional features to meet any requirement. Hoppers also available. Choose the ideal trailer and the most convenient financing plan. For complete information, call the Trailmobile office nearest you or use the coupon.
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MOUNTAIN-MOVING BELT CONVEYORS IN 12th YEAR WITH ORIGINAL IDLERS

Barber-Greene conveyor system still going strong after handling up to 830,000 tons yearly for Blue Ridge Stone Corp.

The Blue Ridge Stone Corp., Roanoke, Va., is blasting, trucking, crushing and conveying away a limestone mountain at the rate of up to 830,000 tons yearly.

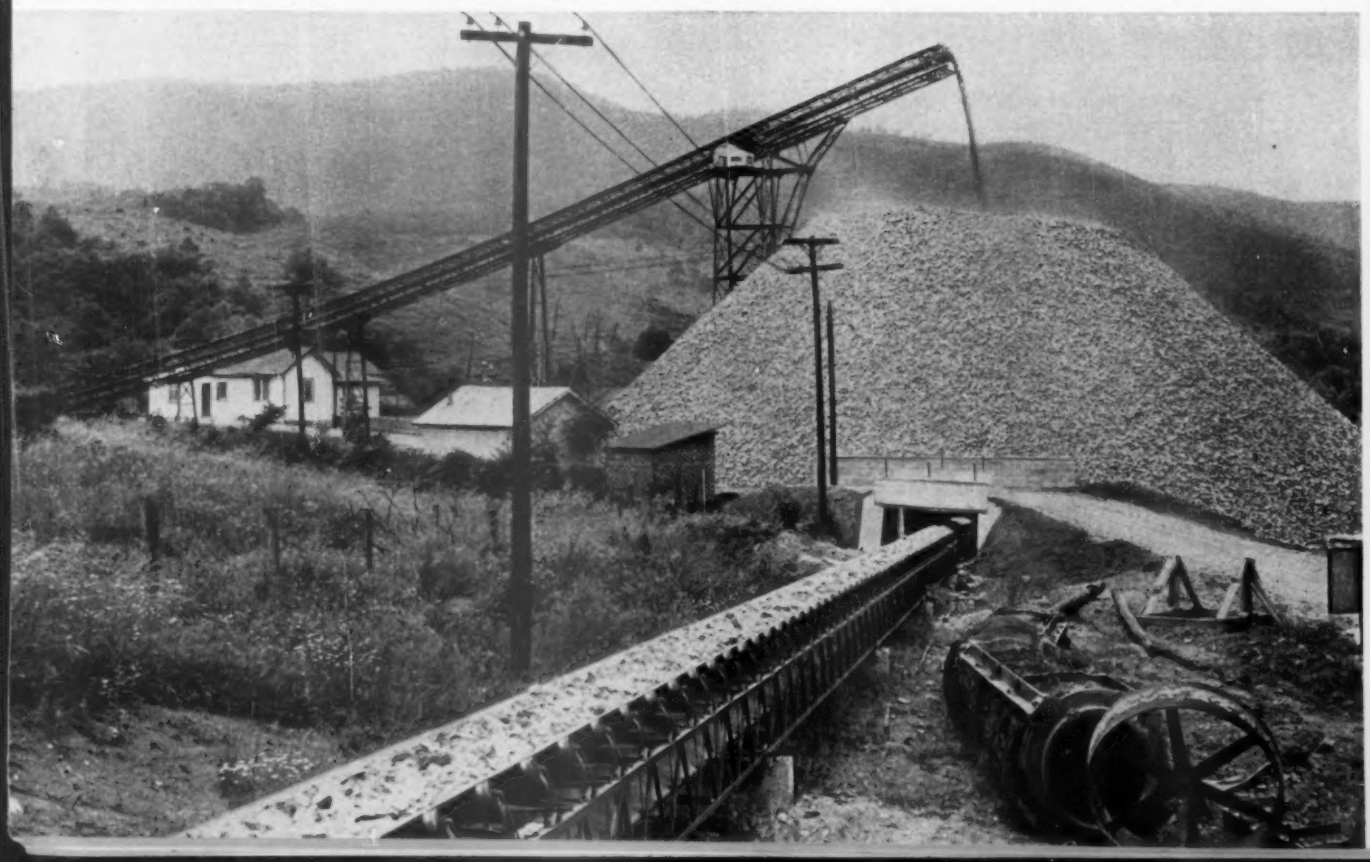
After trucks make the short haul moving blasted rock from face to primary crusher, a 4-flight, 4,150-ft. Barber-Greene conveyor system hustles the limestone from quarry floor to finishing plant.

President Abney Boxley observes, "We've increased production more than 30% over our old all-rail haulage method.

"Since our Barber-Greene conveyors became operative in 1948, we've had 12 years of dependable service with minimum maintenance and downtime. Practically all 1,500 original idlers are still in service and belt life has been extremely good.

"By including a 6,000-ton surge pile ahead of the No. 4 conveyor, we can operate the plant for

6,000-ton surge pile at end of 700-ft. No. 3 conveyor keeps finishing plant operating 24 hours after quarry shut-down. Rock is reclaimed on 1,600-ft. belt leading to finishing plant.



After double reduction of stone in quarry, limestone gets fast ride upgrade on 30" belt of 1,600-ft. Barber-Greene Conveyor enroute to surge pile and then to finishing plant. 4-flight system totals 4,150-ft.

as long as 24 hours after quarry operations have stopped if we bulldoze the stockpile."

Get this same lowest-cost-per-ton-mile solution to your material handling problems by calling your Barber-Greene Conveyor Specialist. He sells pre-engineered and pre-aligned standardized conveyors plus broad design experience . . . a combination that is preferred throughout the aggregate industry for hard-dollar reasons.

Send For New Idler Bulletin

New 44-page Idler Bulletin describes the more than 800 units available in the complete Barber-Greene line, tells how their years-ahead features bring longer life and greater economy to every job. Ask for your copy today.

Your belt conveyor equipment headquarters

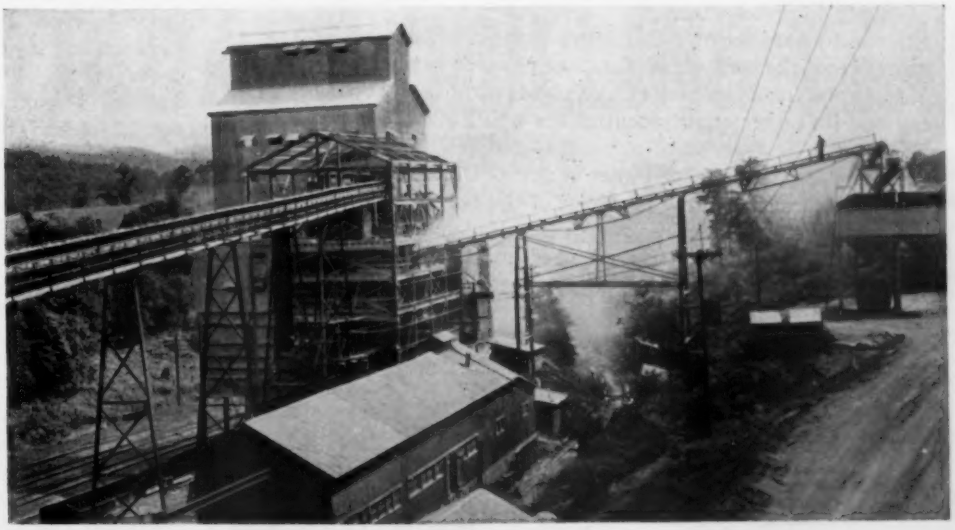
Representatives in Principal Cities of the World

Barber-Greene BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.
Other Plants: DeKalb, Milwaukee, Detroit, Canada, England, Brazil, Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

Finishing plant is last processing point for stone after 4,150-ft. conveyor ride from quarry. Short conveyor loads truck-loading hoppers. Bulk of output is loaded into railroad cars shown on siding.



Fuller's quadrant air homogenizing has been perfected over the last ten years and is used today in over 125 installations throughout the world.

FULLER Airmerge Blending makes the wet process obsolete for many portland cement raw materials

In many cement plants, kiln feed has been obtained, which is so uniform that usual laboratory checks are inadequate to reveal variations.

Except where the unusual nature of the raw materials requires beneficiation by froth flotation, or other wet handling, today's preference is for the Dry Process with its fuel economy and its better quality control through Fuller Airmerge Blending.

Continuing research at Fuller is devoted to the application of pneumatics to the problems of the portland cement industry. Put Fuller technology to work for you.

If you are planning a new plant or improvements to an existing plant, use Fuller's know-how to help solve your quality control problems.

Write outlining your problem and for your copy of Bulletin B-2 on the Fuller Airmerge System. 4076 BA-2

See Pit and Quarry Handbook for further details and specifications.

FULLER COMPANY
100 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

Fuller ....pioneers in harnessing AIR

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Washington News Letter

(*Concluded from page* 11)

spend nearly so much money as has been appropriated to them.

Since much of industry's expansion is internally financed, that is, comes out of its profits, a profit rate lower than expected is certain to result in a reduction in expenditure for new capital equipment—machinery and buildings. This would throw another Administration objective—faster economic growth—out of joint.

Evidence that fear of such a development has also reached serious proportions may be found in the renewed interest in tax programs designed to encourage capital investment. The original Administration proposals were very complicated. For many reasons, they met with almost solid opposition from industry. The story is all over Washington that the Administration is ready to back a program for more rapid write-offs of new capital investments (for tax purposes), a program more to industry's liking.

Indeed, in the textile industry, which has been suffering from an almost chronic depression, such a program has already begun on the basis of administrative action without special legislation. It is confidently predicted that similar programs will be installed first for other depressed industries and later for virtually all industries.

This is the counterpart of the development program for depressed areas. Since the beginning of that program, Washington has been invaded by local officials, each trying to prove that his area is in the worst shape of all. The next step may well be a parade of corporation executives, each trying to prove that his industry is in the worst possible shape.

The Republic Cement Corporation, Phoenix, Ariz., was recently declared bankrupt. Republic, incorporated in 1955, had earlier sought to reorganize, but was denied the right. Assets of the firm include unpatented mining claims in Yavapai County, Ariz., and San Bernardino County, Calif., reportedly with a total value of $1,702,000.

Enter 73 on card, page 149 ➔

TWO ROCK MASTERS AND 900′ BLUE BRUTE COMPRESSOR . . .

HIGH FOOTAGE DRILLING TEAM

What makes the best drilling team? Is it maximum footage? Low fuel consumption? Lowest maintenance? It's all these and more.

Look at the Rock Master drill, for example. It has mobility to get around the roughest ground—to move the air compressor; maneuverability to spot the drill where you want it . . . quickly . . . accurately; stability to hold mast alignment for fast, accurate drilling; simplicity to provide long, trouble-free service; plus the WD-45 Heavy Duty 4½" Drifter for fast drilling.

In one side-by-side comparison the Rock Master put down 3.1 holes per hour. The competitive crawler drill put down 2.7 holes per hour. There's other proof, too, that the Worthington Rock Master can outperform any competitive crawler drill.

What about operation? It has easier, safer controls; a more powerful feed motor for faster steel changes; and an automatic line oiler that reduces maintenance.

What about air consumption? The air consumption of the Rock Master is so low that you can easily operate two units from one 900′ compressor, as is being done on the job above. Or, one Rock Master can operate from a 600′ compressor with plenty of air to spare for boulder popping, running a bit sharpener, a dust ejector or even a blow pipe for cleaning holes!

For the large volume air supply, you can't make a better buy or rental than the Blue Brute 900′ Compressor. It's efficient —less fuel consumed at the end of the day. And it has all the ease-of-operation and safety features you'll ever possibly need.

To get more information on the Rock Master or on the Blue Brute 900′ compressor, call your Worthington rotary compressor distributor listed in the Yellow Pages. Ask him for a quotation, so you can see the Blue Brute drilling team in a truly competitive light. Or write Worthington Corporation, Dept. 61-1, Holyoke, Mass. In Canada, Worthington (Canada) Ltd., Brantford, Ontario.

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Labor Developments

(*Concluded from page* 13)

Board rulings. In one case a union was permitted to picket beyond the 30-day limitation included in the law although the employees in the plant were covered by an agreement with another union. The previous Board had ruled just the other way in an earlier case involving the same people.

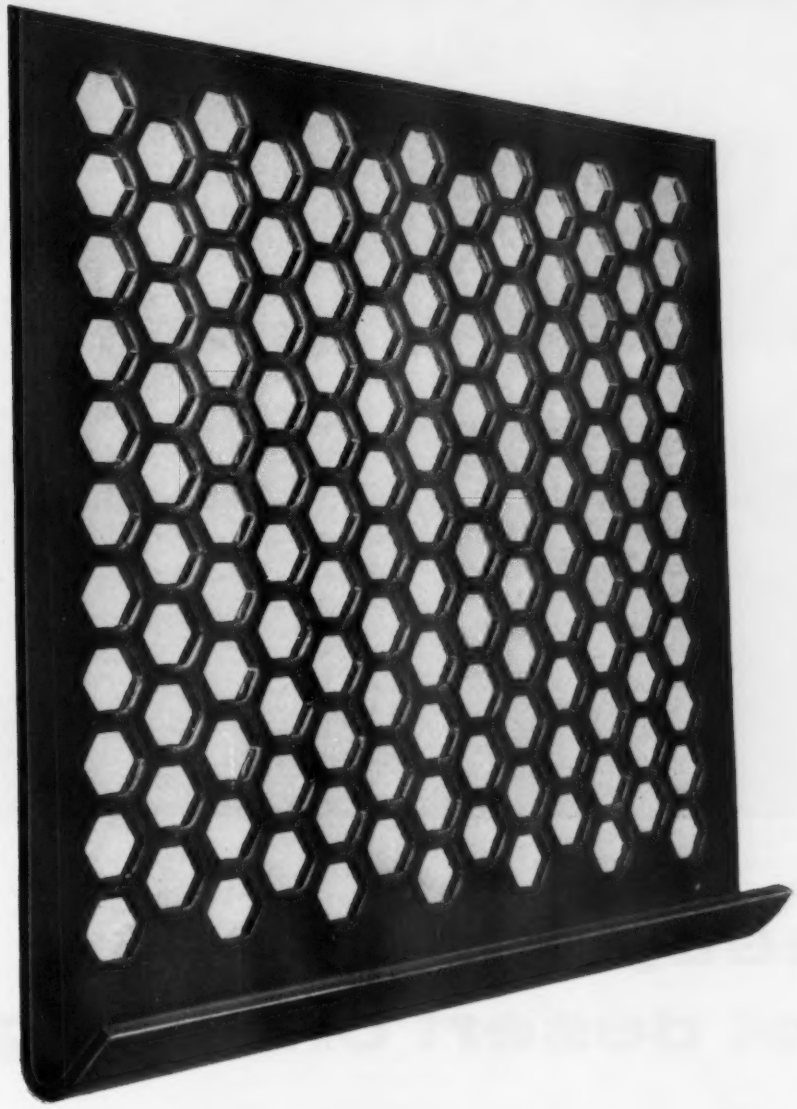
In another case a union was permitted to picket a nonunion shop ostensibly for the purpose of compelling the employer to reinstate a discharged worker. The previous Board had ruled against such picketing on the ground that it amounted to an attempt to force the employer to recognize the union.

The previous Board's extension of the rights of an employer's "free speech" has also come under fire. The new Board ruled that an employee's statement, on the day of the representation election, that a recent decline in business was attributable to the union's organization drive interfered with the election and was therefore a violation of the law.

Finally, so far the new Board has shown none of the previous Board's concern about overextending the range of the law's protection. It upheld the distribution of leaflets in front of an auto agency. These leaflets urged people not to patronize a local radio station. The only connection between the two businesses was that the agency advertised on the station.

Canton Block & Tile Co., Canton, S. D., opened a sand and rock screening and washing plant in September. The new operation is located east of Canton on Highway 18, and will provide sand and crushed rock for road building materials. The company will still produce ready-mix and other concrete materials in Canton.

The Oil City Sand and Gravel Company has under construction a new plant, located in Warren, Pa., to be known as the Warren Sand and Gravel Company, Inc. The new structure, located on a 19-acre site, reportedly will be ready for operation in the spring of 1962.



HENDRICK SCREENS "Precision Perforated" for long life

Hendrick perforated metal screens are manufactured under the most rigid quality-control specifications. Their precision perforations are clear cut and uniform . . . assure continued screening uniformity . . . eliminate blinding. And with Hendrick perforated plates you can screen aggregates faster because their larger open area permits better draining . . . deck changes are also made faster—you save on downtime and labor costs.

Hendrick quality steel perforated plate is made from high carbon or heat treated steels. It is available either flat or corrugated in any desired shape and with perforations of any size. Furnished with standard hook flanges for easy attachment to any vibrator. For more details, mail in the attached coupon today!

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Gentlemen:

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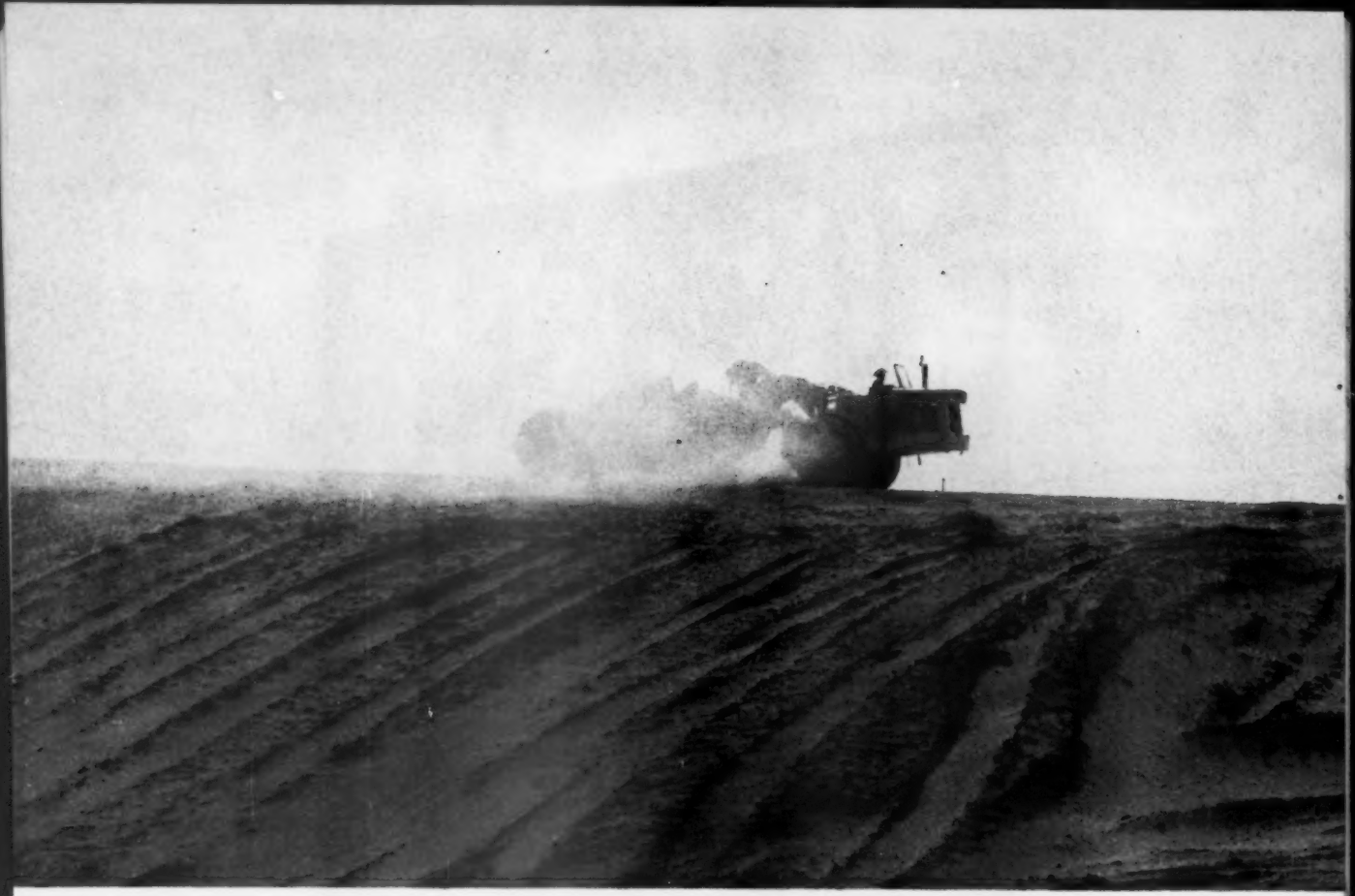

Speedy Michigans meet desert challenge

Strip 40 ft of overburden to keep finished material prices competitive

How do you strip 25 to 40 ft of overburden from a desert sand and gravel deposit and still keep the price of your finished product competitive with pits which strip less than half that depth?

This was the problem facing ex-roadbuilding contractor Sam Sanders, whose sand and gravel operations are located near Portales, New Mexico. Here, 3,000,000 cubic yards of rocky overburden covered a sand-gravel deposit that lay 60% to 80% below water level.

SAM SANDERS
contractor and quarry operator for 54 years

Speed and equipment dependability coupled with large-scale dredging operations turned the trick. A team of Michigan earthmovers working 10 hours a day, 6 days a week are doing the stripping. Despite sand and dust and extreme heat, they've done the job so economically that Sanders not only sells all the sand and gravel he can produce . . . but the product is so well priced customers come from as far away as Santa Fe, 200 miles distant.

Rubber slices $30,000 track repair costs . . . and triples production

The picture hasn't always been so rosy, though. Stripping began with a 33,000 lb crawler pusher and four 18 yd crawler-drawn scrapers. Even on short hauls, this fleet couldn't strip fast enough to keep ahead of dredging. *What's more, track replacement and repairs were costing Sanders nearly $30,000 annually.*

At this point, Sanders decided to try rubber. A demonstration by Michigan distributor N. C. Ribble Company, Albuquerque, quickly proved that only

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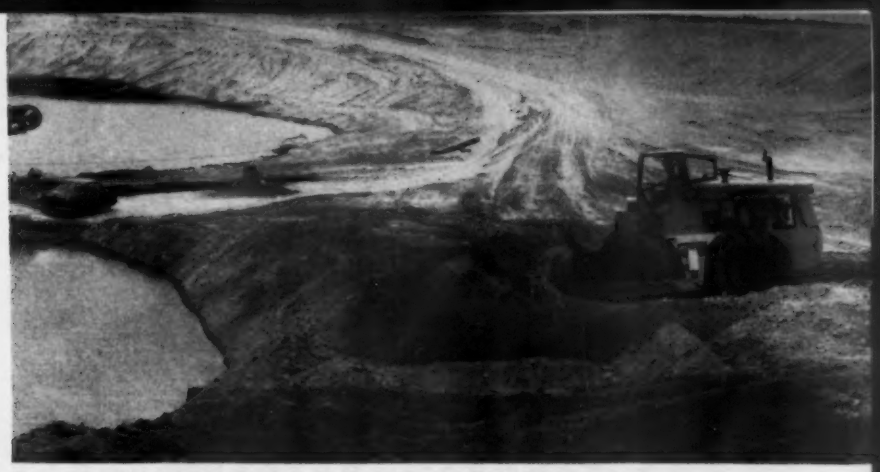

Between pushloading assignments, Michigan Dozer speeds one-fourth mile to the dump area, spreads, compacts earthfill dam.

three Michigan dozer-scraper units would be needed to replace the *five* crawlers. Sanders compared production . . . noted the trouble-free service provided under the same desert conditions by his Michigan Model 175A Tractor Shovel used to load out trucks at the plant . . . and bought a matching 262 horsepower team of one 57,770 lb Model 280 Michigan Tractor Dozer and two 19 cubic yard Michigan Model 210 Tractor Scrapers.

Today, after a season of operation, Mr. Sanders says, "The Michigans move almost three times as much material as our old rigs did in the same amount of time. We expect tires to last at least three times as long as did the crawler tracks."

In rocky sand, Michigan Dozer loads 19 yd Michigan Scrapers in just 40 seconds

Overburden on the 160 acre mesquite-spotted tract is composed of sand, sandy clay, sandstone and silica rock . . . lying in overlapping seams. In this heavy (3200 lb/yd) material, the 262 hp Michigan Tractor Dozer pushloads the 19 yd Michigan Scrapers to heaped capacity *in an average of 40 seconds*. Even where rock seams have not been scarified, the Scrapers often pack in 50,000 lbs (scale-weighed). When rocky seams are especially tight, the scarifier-equipped Dozer back-rips on each return pass.

Dozer also handles fill compaction while Scrapers self-load

The stripped material is being used to construct an earthen dam, now 70 ft high, 100 ft long, containing 200,000 yds of fill. When finished, it will give Sanders the only sizeable body of water within a 120 mile radius.

Hauling to this dam had been a slow process with crawlers . . . one of the major reasons Sanders switched to Michigans. The power-shift, torque converter units haul approximately 6,000 bank yds per day . . . average 15 to 18 mph traveling the quarter-mile ungraded road to the fill. Returns are near a top speed of 31 mph.

During periods when the Scrapers can effectively self-load on favorable slopes, the Michigan Dozer is used to level and compact the fill. With truck-like speeds up to 28 mph, it quickly travels to the dam, spreads 1500 to 2000 yds of material, and returns to the pit before production can sag.

Sanders labels Michigans trouble-free, easy to service

On his Michigan earthmoving team, Owner Sanders reports, "We find them virtually trouble-free . . . and we stick to a strict daily preventive maintenance schedule to keep them that way. Their ability to withstand the abrasive character of the materials being worked and the all-too-frequent sand storms that occur on the job proves we picked the right equipment."

Perhaps Michigans can help boost production on *your* job. Ask your Michigan Distributor to demonstrate any of four Tractor Dozers, 162 to 600 hp . . . three Tractor Scrapers, heaped capacities of 10½, 19 and 29 cu yds . . . nine Tractor Shovels, 16 cu ft to 6 cu yds.

Michigan is a registered trademark of

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Construction Machinery Division

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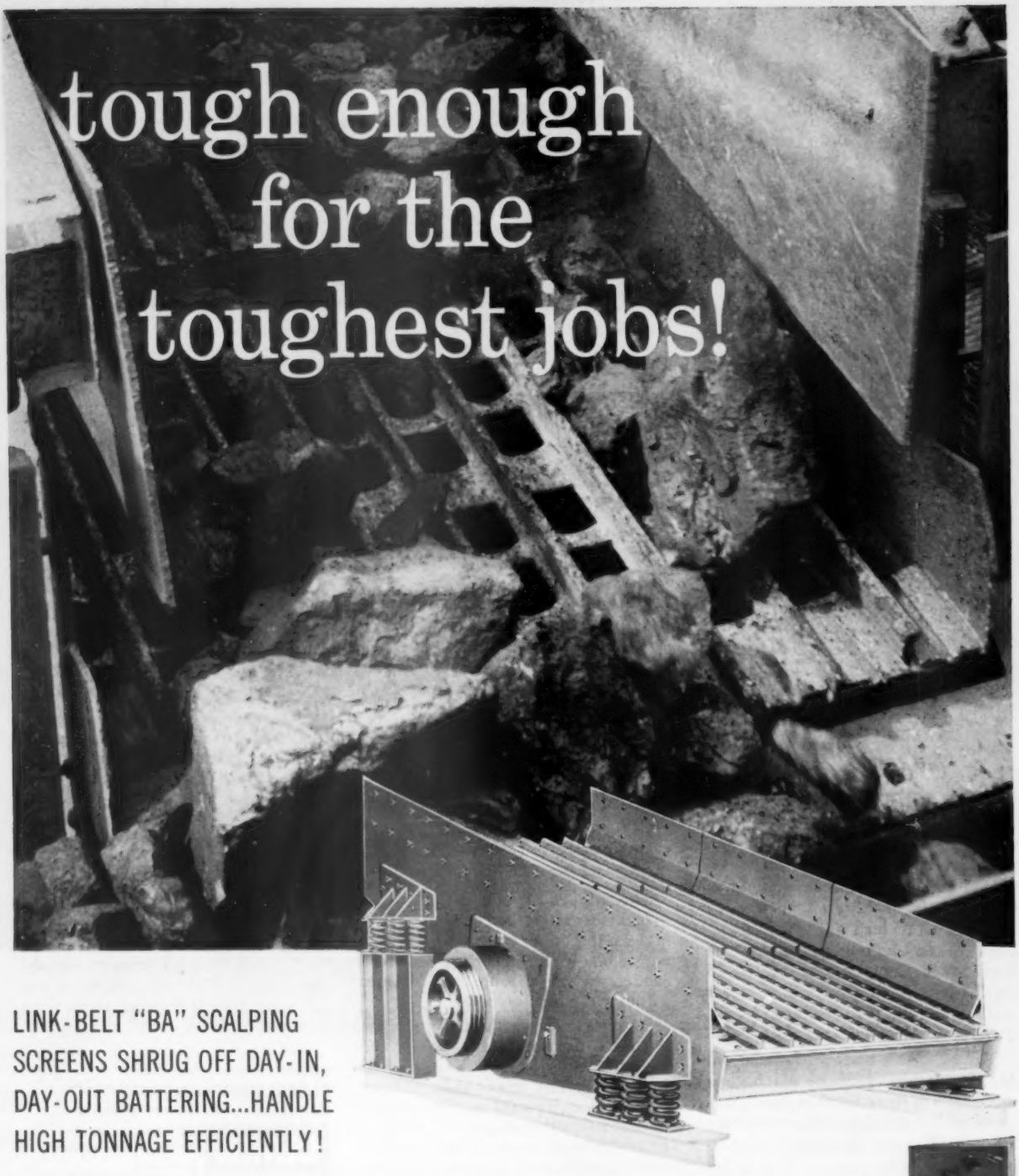
Michigan Scraper-Dozer stripping production, far right, averages 6,000 yds per day

Truck loading at Sanders pit is handled by the Michigan Tractor Shovel shown center right. Unit has loaded as many as 25 trucks per hour, including 18 yd semis.



LINK-BELT "BA" SCALPING SCREENS SHRUG OFF DAY-IN, DAY-OUT BATTERING...HANDLE HIGH TONNAGE EFFICIENTLY!

Here's all the strength, all the durability you need for high-impact, high-tonnage scalping and sizing. Link-Belt "BA" screens easily withstand continuous pounding . . . deliver a vibrating motion that assures thorough action of the deepest bed . . . for low-cost, high-volume screening.

Here are just a few of its many long-life, easy-maintenance features: *SIMPLE, TWO-BEARING VIBRATOR*—easily adjustable for changing the motion; *HIGH-CAPACITY, SELF-ALIGNING ROLLER BEARINGS*—effectively sealed against abrasive conditions; *HYDRAULIC BEARING-REMOVAL DEVICE*—for easy installation and removal of bearings; *RUGGED, WELDED-STEEL DECKS*—formed with H-beam and deep-section ship channels, boxed-in and arranged to provide maximum resistance to impact.

For full information on tough-duty "BA" screens and the many other types in Link-Belt's complete line, ask your nearest Link-Belt office for Book 2777.

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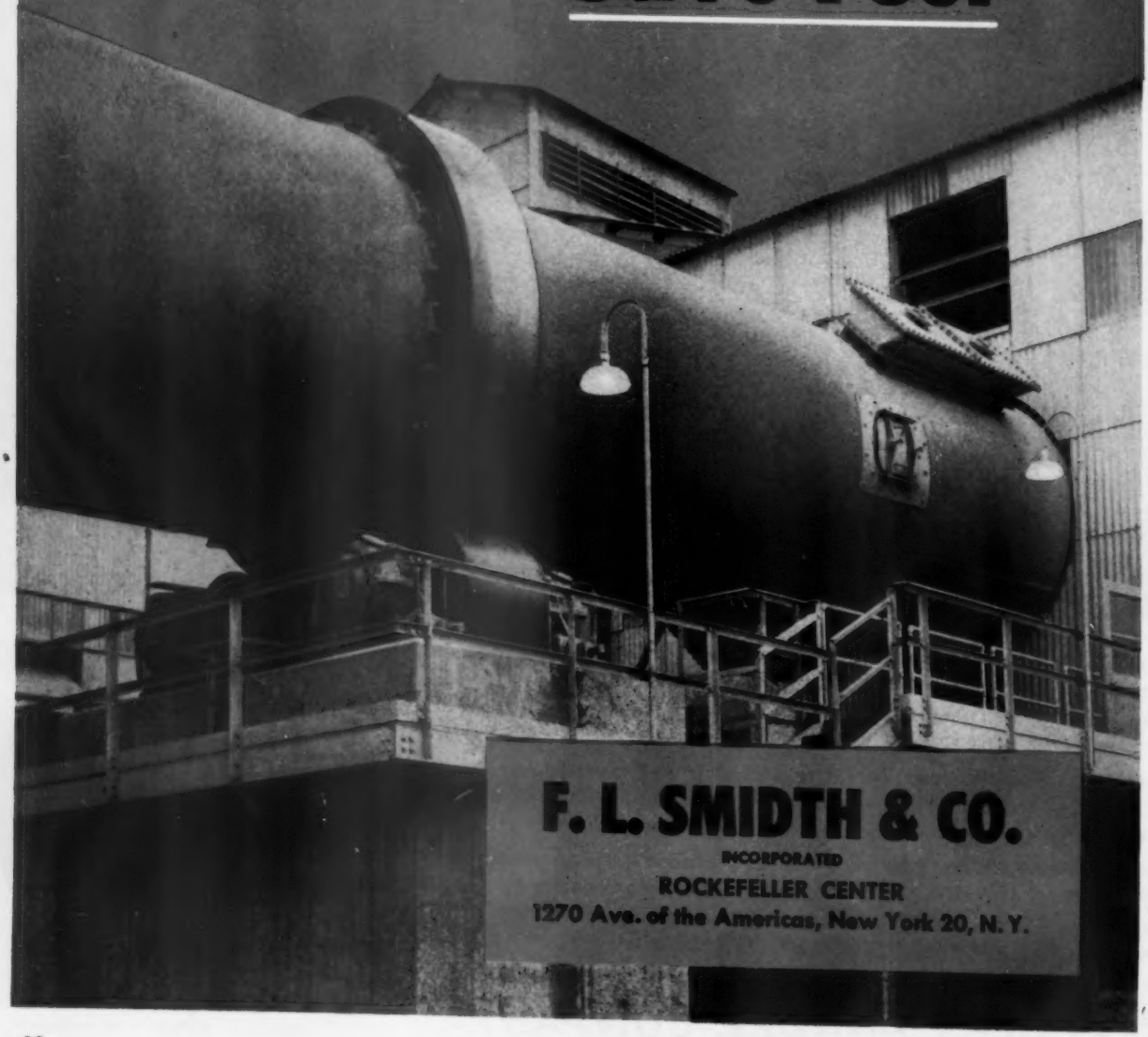
Reduce Dust..

Save Fuel



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The Editor's Page

Important Conventions Ahead

PRODUCERS of sand and gravel, crushed stone, slag, agricultural limestone, lightweight aggregates and other nonmetallic minerals each year are offered the opportunity to get the latest information on many subjects important in the conduct of their businesses. This information will be available at the coming annual major industry conventions, which will include several machinery exhibitions, and at other meetings.

The two important conventions ahead which also feature equipment exhibits are those of the National Sand and Gravel Association (in conjunction with the National Ready Mixed Concrete Association) at McCormick Place, Chicago, Ill., February 5 through 9, 1962; and the National Crushed Stone Association, Conrad Hilton Hotel, Chicago, February 12 through 14, 1962. The National Limestone Institute, Inc., has broadened its board of directors' meeting, to which all members are invited, at the Roney Plaza Hotel, Miami Beach, Fla., January 15 through 19, 1962.

DURING the winter there will be many other meetings of interest to nonmetallic minerals producers, including those of state and regional aggregates associations, mining groups, technical and engineering societies, etc. Information on many of these can be found in the Coming Events column in this issue.

N.L.I. now plans to hold its annual conventions in Washington in June, and the "directors" meetings in January at different suitable locations, except in inaugural years, when the dates will be reversed. At Miami Beach this time the various committees will meet from Monday through Wednesday, January 15, 16, and 17. The Manufacturers' Division will meet on Wednesday, and the board of directors on Thursday and Friday.

The N.S.G.A.-N.R.M.C.A. combined conventions will have all meetings and the exhibits at McCormick Place. The N.S.G.A. Manufacturers Division will meet on Sunday, February 4. Convention sessions will begin on Tuesday, February 6, and will continue through Friday morning, February 9; Tuesday and Wednesday afternoons will be open. The exhibits will be open from Monday morning until Thursday noon. There will be only one place for registration, McCormick Place.

THE N.C.S.A. convention and machinery exhibition will be held at the Conrad Hilton Hotel. Convention sessions are scheduled for Monday through Wednesday, February 12, 13, and 14, with Monday afternoon and Wednesday morning left open for inspection of the machinery exhibits. The latter will be open from Monday through Wednesday, except for Tuesday noon, when the Manufacturers Division luncheon will be held.

The complete official programs of the N.S.G.A.-N.R.M.C.A. and N.C.S.A. conventions will be published in the January, 1962, issue of PIT AND QUARRY, along with layouts of the machinery exhibits, keyed to a list of exhibitors. Complete information on equipment to be exhibited by each company, and the names of the men to be in attendance will be included.

All indications are that these will be the most important conventions yet held, and that the exhibits will set new standards. The N.S.G.A. and N.C.S.A. conventions and machinery exhibits are open to all producers free of charge, and there is only a small registration fee at the N.L.I. meeting. Record-breaking attendance seems assured. If you have not already made your hotel reservation, we urge you to do so at once.

Walter E. Trauffer

SAFETY....

In the Cement, Quarry, and Mineral Aggregates Industries

By JAMES G. KOSTKA

ANOTHER ON THE SPOT REPORT

MEN and women from thousands of different companies and organizations came to Chicago again this fall to attend the 1961 National Safety Congress and Exposition. It was a week-long affair, running from October 16 through October 20.

As in previous years, there was much to see in the way of exhibits. Close to 200 exhibitors displayed some of the newest developments in safety equipment available today.

There was also a great deal to hear. Some 860 speakers who spoke at 43 different sections of the conference were all top safety men in their various industries and had much to contribute in the way of information to those who attended the meetings of the various sections. The fact that each section had men of its own industries as speakers tended to make the audience exceptionally attentive and receptive.

Joint Luncheon Prior to starting their meetings, the Cement, Quarry and Mineral Aggregate Section attended a joint luncheon with the Coal Mining and Mining Sections. The speaker at this meeting was Dan Blount, director of sales training for the International Shoe Company. In his very informative speech, which was laced with substantial doses of humor, Mr. Blount pointed out that safety is a human relations problem. Human beings must be motivated because they are directly responsible for safe practices. Good leaders should be chosen to teach safety because most people look to leaders for instruction.

The general chairman, Fred E. Storch, Whitehall Cement Company, opening the Cement, Quarry and Mineral Aggregates Section meetings.

Teaching and directing safety is a magnificent job, according to Mr. Blount, because there is so much that can be done in this sphere of operation. People are literally fighting for their lives today because accidents are killing more individuals than previous wars.

Safety is based on practice. Try from day to day to do the best you can regarding safety, and a successful pattern of safety will follow.

Opening Remarks The Cement, Quarry and Mineral Aggregates Section meetings were opened by Fred E. Storch, general chairman, director of safety and personnel for the Whitehall Cement Manufacturing Company. In his opening remarks, Mr. Storch thanked all the men who had assisted him during the last year. He also informed the audience that those wishing to participate in the activities of the Section during the coming year would be most welcome because there is a need for dedicated and qualified men to help with its activities.

Officers Elected Nominations were then made for the officers for the coming year. They were the following: Howard F. Johnston (Funkhouser Mills), general chairman; Dorse E. Seipel Jr. (Standard Slag Company), first vice-chairman; Arvid Tienson (Material Service Corporation), second vice-chairman; J. Ralph Treadaway (Vulcan Materials Company), secretary. All nominees were seconded, and a vote was taken from the floor. All were elected unanimously.

Safety Tips and Ideas The first speaker, Leonard R. Flicker, director of safety of the Permanente Cement Company, Oakland, Calif., spoke on *Safety Tips and Ideas* in the Cement, Quarry and Mineral Aggregates Section. His presentation consisted of a series of slides showing safety measures taken in his plant, unsafe practices requiring corrective measures, plus a commentary on each slide.

One slide showed a broken ground wire. These wires serve an important function and should be in operation at all times. Failure to detect or repair a break in such a wire could lead to severe injury or

Exhibits, addresses by authorities in the field of accident prevention, helpful discussions combined to provide an outstanding safety meeting.

Howard J. Johnston, Funkhouser Mills, chairman-elect of the Cement, Quarry and Mineral Aggregates Section.

death resulting from an electric shock.

Another slide showed the use of wooden blocks on the sides of a ramp used by lift-trucks. These blocks kept the trucks from falling off the sides of the ramp.

Fire extinguishers in this plant are painted certain colors, so that they can be located easily. The color they are painted also indicates the type of solution in the extinguisher.

Railings are placed on the platform next to the ball mill to keep workers from accidentally falling off the platform.

The overhead-crane block is painted with black and yellow stripes, so that it is readily seen, thereby keeping people from running into it.

Broken light and plug-in sockets are always a potential source of trouble because they expose current carrying metal that a person can easily touch. Shocks from such exposed areas can be painful, and sometimes fatal.

Oil barrels set on angle-iron racks have advantages. Once placed on the rack by a lift truck, they can't be moved by a worker. This avoids accidents.

Goggles are a must for bagging operators because they keep the dusty material from getting into the workers' eyes.

Portable welders have a fire extinguisher attached, so that if a fire starts due to welding sparks, the extinguisher is always handy for immediate use.

Flex-cable serves two purposes in this plant: (1) it protects electric wire from being broken; and (2) if electric wire is broken, it keeps the worker from coming in contact with the current.

"Men at Work" signs are placed 10 yd. in front of each job on the railroad tracks. This keeps engines from coupling or shoving cars with men in them or with men working behind or under them.

A pull-back device is used on a circular saw, so that when a man takes his hand off of the saw, the saw moves back. This reduces the possibility of a man getting his finger or arm in the saw.

Storage racks should be provided for oxygen and acetylene tanks, especially if they are used above the first floor. This precaution prevents them from falling to the floor and also from falling from a floor above.

Switch panels should have lockout tags to prevent the starting of equipment when men are working on it.

If the door of a building leads directly to a busy road, a railing between the door and the road will caution the person leaving the building.

Safety Aspects of Grounding Portable Tools The first of three speakers on electrical safety was E. J. Matousek, manager of general engineering, International Minerals and Chemicals Corporation, Skokie, Ill., whose talk was on the *Safety Aspects of Grounding Portable Tools.*

It was pointed out by Mr. Matousek that two areas can be discussed in considering the safety aspects of grounding portable tools: (1) why or how portable tools became hazards to personnel; (2) what steps should be taken to prevent the hazard.

The National Electric and Fire Codes have been instrumental in directing builders of industry and residential structures into safe methods of construction. One of these methods is the grounding of one line of the 110-volt system. This grounding procedure, developed primarily as a prevention of fire caused by lightning in residential construction, when considered from the portable tool shock aspect, actually brings in one of the two leads necessary to close the circuit and cause shock.

As an example, in order to cause shock, the human body must become a part of the circuit. This can happen if a man stands on a grounded surface and touches a hot line. A portable electric tool, with a hot line shorted to its frame, in the hands of a grounded man, sets up a circuit through the common ground and subjects the man to a shock.

The human body is basically a salt solution covered by a skin membrane. If the skin becomes moist, its resistance breaks down, and the current flows freely through the "saline solution." The severity of the shock depends upon the vital organs affected, namely the heart and the brain.

Muscles normally operate from electrical impulses generated in the nervous system and usually respond to a frequency of about 50 cycles per second. Contact with a 60-cycle outside voltage causes a saturating

signal that tends to lock various muscles involved, causing some shock victims to be unable to let go of a hot wire. This saturating effect blanks out normal signals; if it occurs in the vicinity of the heart or brain, artificial respiration is required to keep the oxygen entering the body until the paralyzing effect is dissipated and the normal functions of the body take over.

To avoid shock, a man should be prevented from becoming a part of the circuit. One way this is done is by insulating or eliminating all metal or current-carrying exposed parts. The use of plastics in new tools make this possible to a great degree. Existing tools with exposed metal parts, however, require safety measures. The best solution is to ground all metal exposed parts of a tool with a separate conductor, thereby providing a low-resistance path for the stray ground current.

During the last 10 years the ground wire has become almost standard in industrial construction. Generally, the ground return circuit is formed by a conduit system, and receptacles are provided which connect the separate ground conductor of the portable equipment to the ground grid. Standardization of plugs and receptacles has been difficult to achieve, and even the solution now accepted does not necessarily solve all problems.

One major problem is that many tools and appliances do not have three-conductor cords and cannot be used in some receptacles unless an adapter plug is provided. Similarly, a tool with a three-conductor plug cannot be used in a shop which is equipped with out-of-date two-prong receptacles. The solution to this problem is to use a plug and receptacle adaptable to both two- and three-way plugs. If the tool does not have a ground wire, it can be used, but the safety aspect of the three-wire receptacle is lost.

When a ground wire is used on a tool with exposed metal parts, the ground should be checked before the tool is used. The ground wire could break or be disconnected, causing the user of the tool to be exposed to possible lethal shock.

Some companies have devised tool checks that automatically check electrical tools before they are issued. The checker automatically passes a high current through the ground wire and maintains this high current long enough to burn out any thin strands, if that is all that is left of the ground wire. The tool is then subjected to a high voltage test, approximately 500 volts, to check deteriorating insulation. It is also tested for a short circuit in the motor armature.

"The tragedy of belt conveyor accidents is that we know how to prevent them," emphasized Leslie S. Voltz, Consumers Company Division, Vulcan Materials Company.

Ground Faults in Quarry Operations The second speaker on electrical safety was Herbert P. Cassel, assistant superintendent-power, The Whitehall Cement Company, who spoke on the topic of *Ground Faults in Quarry Operations*.

It is the contention of Mr. Cassel that we have at times been negligent in the installation and maintenance of proper grounding for large and small portable electrical equipment. Some of this equipment used in quarries operates at voltages ranging from 2,300 to 13,000. The fact that such high voltages are used, plus the uncertainty of obtaining good grounds in areas such as quarries, demands that we carefully examine our grounding practices.

A ground fault develops when one of the main conductors of power accidentally touches the framework of the machine involved. It may be caused by a breakdown of insulation anywhere on the machine. It may be at the point of entrance of the portable cable, in the switches or wiring on the machine, or in the windings of the motors or generators driving the machine.

Ground faults of this kind can subject personnel standing on the ground and touching the frame to a shock varying in intensity from a slight one to a fatal one. Since even the best installation is still subjected to occasional breakdown, the safety problem involved concerns control of the intensity and duration of the shock hazard when such breakdowns occur.

Considerable investigation has been undertaken to determine the limits of human reaction to electric shock. Due to the great variations in individuals (varying reactions to shock) and many other variables, the evidence of these studies is only generally conclusive. However, broad limits may be set which will apply to most cases and conditions.

The severity of any electrical shock, all investigations agree, is a function of intensity and duration.

The intensity of the shock depends on the voltage encountered and the bodily resistance of the individual in that portion of the body through which a particular electrical current may pass. Investigators in this area have set values ranging from 500 to 1,000 ohms.

The amount of current flowing through the body having such resistance will depend on the potential or voltage encountered. The following is an indication of what probably will happen with varying amounts of current flowing through the body:

1. 1 milliampere—No sensation
2. More than 5 ma.—Painful shock
3. More than 10 ma.—Muscle contraction—2.5 percent of population will freeze to contact
4. More than 15 ma.—50 percent of population will freeze to contact
5. More than 30 ma.—Breathing difficult—unconsciousness may occur
6. 50-100 ma.—Possible ventricular fibrillation of heart
7. 100 ma.-2 amps.—Certain fibrillation of heart.

With these results in mind, mining industry leaders, some years ago, set 100 volts as the maximum allowable potential that should exist between the frame of a machine and the earth during a ground fault.

At this point Mr. Cassel used slides showing schematic diagrams to illustrate what happens when ground faults occur when a shovel or a dragline is used in various types of situations. The examples shown indicated that adequate protection of human life and health against electrical shock hazards can be arranged. Here are some of the ways it can be done:

1. All electrical installations should be made with highest degree of skill possible.
2. Neutral point of Wye-connected transformers should be grounded through a resistor which will limit ground fault current to 50 amperes or less.
3. Ground connections from this resistor should be carried through the portable cable and terminated on the frame of the machine involved.
4. Relaying should be installed in the neutral of the transformer, which will remove the faulted circuit from the source of supply.
5. Ground connections, cables, and rods should be periodically tested to insure the lowest possible resistance in the ground circuit.

To accomplish all this will require time and effort and will cost some money; but it is a small price to pay to make a plant a safer place.

Hazards Caused by Improper Application of Knife Switches

The final speaker covering the subject of electrical safety was George J. Reynolds, technical manager-electrical, United Gypsum Company. His talk covered *Hazards Caused by Improper Application of Knife Switches.*

According to Mr. Reynolds, inadequate knife-type switches are the greatest single cause of electrical accidents in his company. Because of this fact, the company's main objective is the elimination of the knife switch entirely if possible, wherever a lockout switch is required. If lockout is inconvenient because the main breaker is too far away, a safety lockout breaker should be added.

A number of accident cases in which knife switches were involved in his company were then discussed by Mr. Reynolds. Slides were also used to illustrate the equipment, results of damage, etc.

In one case the knife switch was used only to open the circuit visually for safety reasons after the power was off. The reduced voltage starter was used to start the motor and was operated by a push-button. After the motor was stopped, theoretically, it should have been safe to open or close the knife switch because there was no load on the circuit at that time. In this case the starter contacts had fused when inching the motor, but the knife switch was safely pulled without damage.

Later, when the switch was closed on a starting load, because the starter contacts were fused shut, the switch was closed on a load which the switch did not have the capacity to take, and the switch exploded. The cover flew open, striking and injuring the man who pulled the switch.

The electrical explosion that occurred at the time of the accident was caused in the following way: the switch did not have snap-action or arc chutes, and the handle mechanism was so worn that the blades in the closed position barely touched the energized contacts, thus drawing an arc. The arc ionized a pocket of gas around this contact point and the pocket soon spread to envelop a second contact. Ionized gas is a perfect conductor of electricity; therefore, a dead short circuit occurred, which in turn ionized the rest of the air in the box and created a gaseous explosion.

A similar situation occurred at U. S. Gypsum's North Kansas City plant. A short time prior to the accident, the motor driving the duplex stock pump on the liner beater kicked out. Restarting procedure was explained to the maintenance foreman as follows: open the switch to the motor controller (440 volts), reset the overload trip on the controller, close the switch, and restart the motor.

In the same enclosure there was also another larger knife switch, which controlled the power supply to the liner breaker beater control. When the motor kicked out again, the foreman proceeded to put the motor back into operation. He opened the door on the switch enclosure, grasped the handle to the pump switch, and pulled it open. There was a violent electrical explosion in the enclosure.

"Knife switches are the greatest cause of electrical accidents in our company," stated George H. Reynolds, U. S. Gypsum Company.

Injuries sustained were temporary blindness and first and second degree burns involving the right arm, right side of the thorax, and the right side of the abdomen.

In this case it was assumed that the injured foreman's hand or forearm got close enough to the conductor to draw an arc and start the ionization process, which set off the short circuit explosion.

Not all such accidents are confined to a single isolated knife switch. A very serious accident in the Boston plant of the United States Gypsum Company resulted from a great number of fused knife switches in a single cubicle. The electrician had finished his checking and was standing about 2 ft. in front of the panel, with the doors closed, waiting for the plant to start up. Suddenly, upon start-up of the plant, an arc was evidently drawn from one of the loose contact points of a knife switch, thus ionizing the air and causing a short circuit explosion. The doors blew open with great force, and the man standing in front of them was totally enveloped in gaseous flames.

The net results of the accident were: (1) 45 days spent in the hospital by the victim; (2) several skin graft operations; (3) partial loss of the use of the left arm; (4) disfigurement of the left arm; (5) a total of 85 days loss of work; (6) direct loss (medical only) to the company, $4,000.

The following action was taken as

a result of knife switch accidents at the United States Gypsum Company. The first step was to classify the types of switches and their respective hazards in relation to the classification in the company's Operating Division Bulletin #604, *Electrical Safety Lockout Switches:*

Make a survey and hazard classification as per the following:

Group I—Extremely hazardous and should be replaced at once

1. Underrated as to hp. requirement per manufacturer's recommendation
2. No spring or snap action for closing or opening knife blades
3. No arc chutes
4. Non-interlock cover

Group II—Hazardous, but safe if proper precautions are observed

The switches are fully rated, but lack one or more of the above safety features such as 2, 3, or 4. These switches should be clearly labeled as hazardous, and personnel (should be) notified not to operate them while the switch is energized.

These should be scheduled for future replacement on planned maintenance basis over a period of possibly several years.

Group III—Safe and suitable for operation

These switches are fully rated and have all the safety features listed in the above. The switches in this group would be continued in operation during their life expectancy.

Necessary steps should be taken to replace Group I knife switches with adequate molded case circuit breakers having safety "lockout" handles, as promptly as possible.

A planned maintenance schedule should be set up for replacement of the Group II switches.

The next step was to disseminate the above information to all of the company's plants in the field through channels that would set up authority for execution and assume the responsibility for compliance. This was handled through the operating managers, their production managers, and plant works managers.

Falls During Bulk Materials Loading Operations

On the second day the speakers discussed safety problems other than those of an electrical nature. Leading off this group was James M. Christie, safety engineer, the Portland Cement Association, speaking on *Falls During Bulk Materials Loading Operations.*

The problem of falls during bulk materials loading operations is not new. It is merely being brought to our attention more strongly now because of the increased usage of trucks for bulk hauling of cement products. This trend has resulted in many injuries to employees. In order to emphasize what he had to say, Mr. Christie related case histories of some accidents that had taken place and their end results.

In one case a man fell 15 ft. from the top of a rail car. The fall resulted in the man's death, indicating that a fall from this height always provides a potential fatality. Most falls in the cement industry, however, involve falls to a lower level, whether loading into truck trailers or railroad cars.

As an example, one injury occurred when a man tripped and fell on top of a trailer and fractured three ribs on his right side. He was comparatively lucky; he might have fallen into one of the open hatches and possibly suffocated.

There is a known case in which a worker loading finely ground material tripped and fell into the loaded section of a rail car. For a brief interval he was submerged in the finely ground material. Fortunately, quick action on the part of another employee saved his life. Another example given involved a bulk truck. The employee stepped into the opening on the top of the truck with one leg and suffered a severe bruise of the groin.

Since there are people working in locations where they are exposed to injury from falling, it is necessary to prevent these falls. This can be done best by tying people in place or by building a fence around them.

The Portland Cement Association has established certain safety precepts their members use to guide their safety efforts. The one specific to this situation states, in part: "A safety belt and line properly attached, adjusted, and anchored shall be worn by each person working on an unprotected perch more than 5 ft. above a lower surface."

Slides were then shown to give examples of using a fence or tying a man in place when the drop is more than 5 ft.

One method of tying a man in place is to use a belt and a line attached to a horizontal overhead cable by a ring, allowing the man free lateral movement.

Sometimes there is a problem of stringing and attaching the overhead cable, but in most cases adjacent and overhead structures make this task easy. However, in case no structure exists on which to attach a cable, a pole with an extending arm has to be set up for the overhead cable at the loading site.

Next, some examples of the utilization of platforms and fencing for eliminating fall hazards were shown. One slide showed a platform and rail used by one plant for bulk-loading of trucks. The plant worker never gets on the truck. The driver, who is governed by the safety regulations of his own company, opens and closes the hatch.

Another group of slides showed a pivoted walkway to get out to a truck or railroad car. Both fencing and tying are involved in this situation. The platform on which the employee stands is hinged and counterweighted to keep it out of the way when a truck or railroad car is being spotted. When needed, it is used as the access to the truck or car. It has handrails; but once an employee goes beyond these, he lacks protection, so he requires tying also.

During his talk Mr. Christie brought to light one other mechanical device used for bulk-loading safety. It consists of a line that is mounted on an automatic reel. The reel contains 16 ft. of steel cable that extends or retracts automatically with normal movement of the user. Then, should he lose his balance and start a rapid extension of

the cable, a locking mechanism in the reel stops the movement in about one foot.

The advantage this tying device has over others is that the man is attached — and protected — at all times. On the other types the man ties on to the cable *after* he climbs to the top of the railroad car or truck. He could fall while climbing up the ladder and also while attaching his line to the cable overhead. Because of the constant protection given to the man using the reel device, a number of cement plants are using it today.

In order to reduce accidents due to falls we must exert efforts to provide work situations where fall potential is either eliminated or drastically reduced. This is not an easy task, because resistance is often encountered from management, supervision and employees when attempting to institute new safety practices or equipment. To have a safe plant this resistance has to be overcome.

Belt Conveyor Hazards The next speaker of the afternoon was Leslie S. Voltz, safety engineer, Consumers Division, Vulcan Materials Company. His subject was Belt Conveyor Hazards.

According to Mr. Voltz, the tragedy of belt conveyor accidents is that we know how to prevent them. We know the essential rules covering the mechanical and electrical devices and their operation, so that we could eliminate hazards to our employees. We also know the necessity of specific rules and regulations concerning the operation of belt conveyors which must be "hammered" into the minds of the men.

A belt conveyor is deceptive. It travels along almost noiselessly at 350 to 450 f.p.m. Yet this seemingly harmless equipment is capable of causing serious personal injury or death with relative ease.

In a series of slides called *Death Takes a Holiday,* Mr. Voltz showed how one man cheated death in a conveyor accident. A working foreman was instructed to repair the chute at the bottom of a 42-in. belt conveyor from the screening building to the load-out bins. The conveyor was not running, and, according to the man's statement, he pulled the emergency cord to make it inoperative. He then proceeded to get on the belt and start the repairs. While the employee was standing between the angle supporting the skirt plate and the conveyor cover, the belt was started from the control center at the load-out bins. He was knocked down by the cover and started up the conveyor head first. Since he was traveling about 7 f.p.s., he could not pull the emergency cord on the side of the conveyor.

During his 220-ft. trip this man was flattened by ½-in. belting used to shape the material on the belt before it comes to a weighing device. The clearance from the bottom of the ½-in. angle supporting this is 21 in., and it is 11 in. from the trough of the belt to the crown of the belting.

Most of the time the man traveled under conveyor covers, except for a few short openings he passed under. These did not afford enough time to pull the emergency cord.

After traveling 220 ft. to the head pulley, he was dumped into a chute with a 12-in. clearance. From there he went into the load-out bin. Through some miracle, this man was able to get out by himself and then walk from the tower, with some assistance. Examination at the hospital did not disclose any fractured bones or serious lacerations. His body, however, was so badly bruised all over that he was disabled for 22 days.

Why did this accident happen? The plant had been provided with danger tags. Only the previous week locks had been received to institute lock out systems. The employees had three separate places to tag out, lock out, or both tag and lock the power to this conveyor, as follows: (1) at the emergency switch at the head pulley of the conveyor, (2) on the control panel at the load-out bins, and at (3) the circuit breaker for the unit under the load-out bins. None of the tags was placed at any of these points.

The next series of slides showed some of the hazards encountered in the process of repairs, or as the result of repairs or maintenance. Here are some of the things that were shown: a guard not replaced following repairs, ladders incorrectly placed or used, conveyor walkways with openings, no toe boards, and missing cleats, material left on stairs, a pinch bar left on a walkway, unguarded platforms, unguarded flexible coupling, and many others.

Another case history was given on a quarry employee who was cleaning the tunnel floor under a 42-in. belt on the tight side (opposite the emergency cord), where there was an 18-in. clearance between the conveyor and the wall. He was using a long-handled scoop shovel and throwing the spilled material back onto the top run of the belt. In the process the handle of the shovel was caught between the operating belt and the idler, pulling the worker's left arm and shovel blade under the belt. The throat of the shovel held a part of the weight off the employee's arm and prevented the idler from turning. He remained pinned in this position from two to three hours.

This man was treated for third-degree burns of the left forearm and hand. Injuries involved the tendons, muscles, nerves, arteries, and veins. He had a multiple debridement of the left arm. He was discharged from the hospital 103 days later, but had to report back three times a week as an outpatient for further debridement of the skin and conditioning of the skin graft.

The final outcome was total disability of the left arm and hand and a cost of $18,095 to the company for hospitals, sanitariums, medical care, temporary compensation, permanent disability, and payment into a special state fund.

The next series of slides dealt with a belt conveyor fatality. A construction foreman and his superintendent were training a 60-in. belt conveyor before starting time at a new quarry. Because ice had accumulated on the return idlers, they loosened the bolts on the bottom of the return idlers, next to the walkway, and hammered them into a position to move the belt to the opposite side. During this time they also removed some ice from the pulleys and return idlers.

When this was completed, the superintendent left the foreman on the conveyor walkway to adjust the return idlers after the belt was started, if the previous adjustment had been too great. This was done by tapping the bottom of the stand in the correct direction. (*Turn page*)

To make this correction it was not necessary for the foreman to leave the walkway. When the superintendent arrived at the control, as agreed with his foreman, he instructed the operator to start the crusher and belt. Four or five truck loads of stone had been dumped when these units were shut down from a control center. The attendant was advised that a man had fallen from the belt. An investigation revealed that the foreman was dead at the foundation for the take-up device.

This foreman had years of experience with conveyors. He had erected this and many other conveyors on the same job. The superintendent knew all the hazards, but in some way, somehow, somewhere there was a slip, and death resulted.

In closing, Mr. Voltz stated, "An organization whose management personnel are the most definitive disciplinarians generally have the best safety records and competitive costs." There is a close correlation between safety and production efficiency.

Practical Approach to Safety Effectiveness The final talk of the meeting was given by W. P. Leake, general superintendent of the Louisville Cement Company, who spoke on *A Practical Approach To Safety Effectiveness.*

Because Louisville Cement Company's safety record was usually better than the average for the industry for a number of years, the management and workers were satisfied with their safety effort. However, one or more disabling injuries each year ruined the chance for a perfect safety record, and it was realized that safety wasn't being given top emphasis as one of the company's most important problems.

In 1956 the Portland Cement Association developed a set of 22 Model Safe Operating Practices which were designed to control and reduce the fatality rate within the cement industry. The Louisville Cement Company adopted and approved these practices and recommended their observance by all member companies. This was the starting point around which the Louisville Cement Company developed a revitalized safety program. At this time it was also realized that safety requires the constant co-operation of every man on the job and on every level of management.

A thorough study of the Model Practices revealed that most of them were supposedly already in effect in the plants. The question then was, why wasn't the accident record better than it had been? There was only one answer . . . the program was receiving only passive support.

It was clear that everyone in the organization, from top to bottom, must wholeheartedly support the safety program. It was then decided it would be necessary to adopt the Model Safe Operating Practices to conditions and practices within the company's plants. It was also decided to include a penalty system for violations as a deterrent.

Top management gave full support to the plan and was delighted with the enthusiasm shown toward the proposed safety program. One of the first things that was done was to revise the safety manual, which had not been changed in 20 years. With a group of key supervisors, a new safety manual, which included the principles of the Model Safe Operating Practices, plus many company rules and practices, was prepared. Several months and many meetings afterward a manual acceptable to those preparing it was ready.

The next step was to have the manual accepted by everyone. The method of approach here was to contact each echelon of supervision and employment as a group and go over the proposed manual and get all the suggestions and amendments they had to offer. Due consideration was given to each suggestion; then the entire plan had to be reviewed again, incorporating all accepted suggestions.

The publishing of the printed *Employee Handbook of Safety and Operating Procedures* finally resulted. Not everything appealed to everyone, but every person knew what it contained because he had a part in creating and approving it.

It was believed that the safe operating practices would be most effective if a penalty system for violations was included as a deterrent. Therefore, a section on penalties for infractions was included.

The lightest penalty prevents a man from working until he wears personal protective equipment. Each employee, including foremen and other members of management whose duties include entering the plant area, is required to wear safety shoes, eye protection, and hard hats 100 percent of the time he is in such areas. Next in severity is a violation that draws a letter of warning for the first offense; and the penalty of dismissal is enforced only after the fourth offense. For more serious violations, the penalties start with a reprimand letter, followed by a five-day suspension without pay or by dismissal. An example of dismissal on first offense is for such actions as transporting dynamite and detonators in the same vehicle.

An adjustment period was provided at first, during which no penalties were invoked for rule infraction. Gradually the employees began to form a safety habit. The adjustment period ended in July, 1958. By that time it was not necessary to rely on penalties to get compliance.

Because some employees are prone to forget, attention getters are used at regular intervals to remind everyone that it is the company's intention to follow up on this plan and to investigate failures or any new or previously undiscovered unsafe conditions.

Permanent committees, such as those on plant-wide safety, housekeeping inspection, safety suggestion system, incentive awards program, etc., keep the program active.

These committees are on a rotating basis, carrying over enough old members properly to instruct new members, so that continuity is not lost. Films, meetings, and plant rallies are used to stimulate safety throughout the organization.

In 1959 a policy of putting on recognition dinners was adopted, at which safety plaques were presented to departments in the plant operated at least 1,000 days without a lost-time injury. Safety records deserve recognition and credit, and their examples create standards of performance for the rest of the plant.

Since the inauguration of the revised safety program at the Louisville Cement Company, lost-time accidents and injuries have declined steadily.

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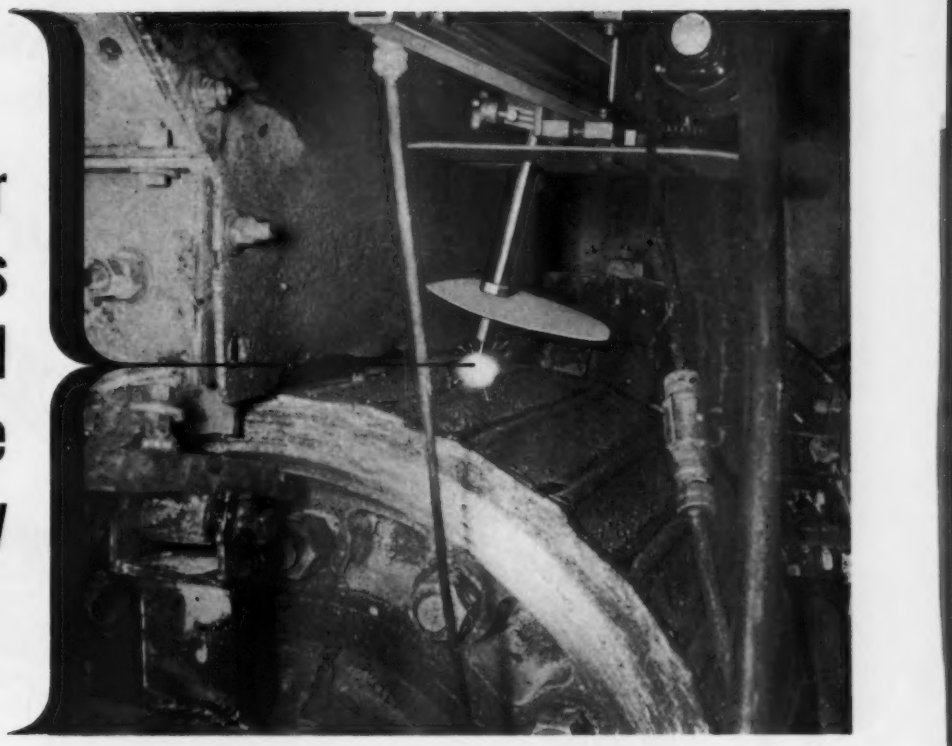

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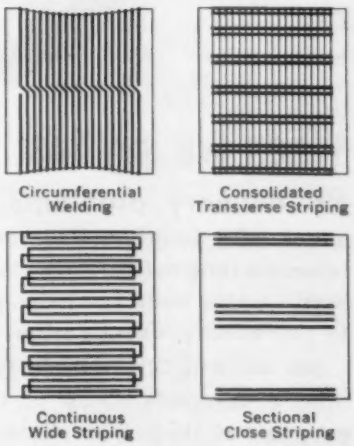

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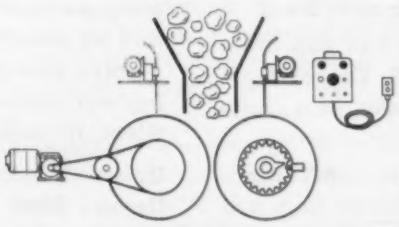

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Development of New Markets, Need for Continued Research Emphasized at

44th Annual N.S.A. Convention

By WALTER E. TRAUFFER

THE National Slag Association members attending the 44th annual convention at the Pocono Manor Inn, Pocono, Pa., October 3, 4, and 5, 1961, came away with a good general impression of conditions and problems in the industry, and of prospects and plans for the future. The subjects discussed covered a wide range, from the short supply of new blast-furnace slag to the development of new markets for it. The large potential market for expanded slag as a lightweight aggregate received considerable attention.

In his welcoming address, N.S.A. President Edward C. Levy (Edward C. Levy Co.) stressed the growing recognition of slag as a concrete aggregate, and briefly reviewed the effort, research, and tests which helped to achieve this. The association's research laboratory was a big factor, he said, particularly in the development of new uses; and all of this emphasizes the importance of co-operative effort by the industry.

The next annual plant operators meeting will be held in Washington, D. C., in late March or early April. The 1962 annual meeting will also be held in Washington in the second or third week of October.

Re-election of Officers All officers of the association were re-elected at this meeting, as follows: Edward C. Levy, president; George W. Lanier, vice-president; E. W. Bauman, managing director-secretary; and W. S. Shaw, treasurer. At this meeting Fred Hubbard formally resigned as director of engineering and was made an honorary director. The same honor was accorded C. A. Barinowski (Vulcan Materials Company), who is retiring from active business. An honored guest at the meeting was L. A. Beeghly, president of the Standard Slag Company, who has been a slag producer for 53 years.

Edward C. Levy (Edward C. Levy Company, Detroit, Mich.) was re-elected president of the National Slag Association at the recent annual convention at Pocono, Pa.

Managing Director's Report According to E. W. Bauman, managing director of N.S.A., the association's program of activities for the last year followed the same basic pattern as in recent years. The problems facing the industry are still basically the same, with only minor differences. For this reason activities again included research, engineering, consultation, publicity, distribution of information, publications, industry statistics, and safety.

With respect to publicity, Mr. Bauman said that the work on degradation of aggregates, involving slag and crushed stone, has been broadened, and the results will be a part of an A.S.T.M. bulletin. The association's high-strength concrete series—N.S.A. 161-2—will be presented at an A.C.I. regional meeting. Another publicity item recently released by N.S.A. describes the use of expanded slag in the construction of multistory apartment buildings in Europe. Serious consideration is being given to the further improvement of expanded slag aggregates in this country on a workable production basis, in order to increase the market.

Included in the literature distributed to members is a compilation of slag patents issued in this country from October, 1936, to July, 1961. This is intended to stimulate the thinking of members regarding new applications, as suggested by various patentors.

Mr. Bauman pointed out that in the 1960 N.S.A. Safety Competition, 33—or 67 percent—of all participating plants were operated without a disabling work injury. Congress is showing interest in safety in the nonmetallic mineral industries, and this, he said, could lead to an industry-wide program or even a federal program.

An important service of the association is the issuance of master file releases and circular letters. One of the most significant of these was Circular 15-61, accompanying a copy of the Bureau of Public Roads Standard Specification for Construction of Roads and Bridges on Fed-

eral Highway Projects — FP-61. This, he said, is undoubtedly the most comprehensive acceptance of slag as an aggregate for use in all types of highway construction ever registered in a federal specification.

In closing, Mr. Bauman said that the association finances are in good order and that the membership still represents about 90 percent of the total production of slag in the United States.

Engineer's Report D. W. Lewis, chief engineer for N.S.A., presented a summary of the many and varied activities carried on by his department. In addition to the research activities previously publicized, work has been completed on the corrosion of roofing metals used with slag and gravel and the open-hearth weathering of slag. Work is under way on freezing and thawing tests of concrete with slag aggregate to determine the relative effects of freezing in air and water. Supplemental tests are under way on a particular admixture which gave excellent results in earlier tests when used with slag aggregates in concrete. A second series of co-operative tests made by N.S.A. and Bethlehem Steel Company is nearing completion. The purpose of this series is to verify the indications of the initial tests on the importance of oxygen in controlling corrosion rates and to obtain additional data on corrosion control by "purging" or oxygen removal from the autoclave.

The investigation of iron content in slag aggregate is near completion and this shows wide variations. Results are expected to lead to improvements in test procedures and more realistic limits for specifications.

The project at Pennsylvania State University on the chemical, petrographic, and physical properties of slag has been under way more than a year. Unit weight differences from 71 to 95 lb. per cu. ft. were produced by different cooling rates in the field. Tests also confirm previous indications that aging decreases Los Angeles Abrasion loss, and that it slightly increases the unit weight of the coarse aggregate. It was decided to continue this work for a second year.

Work with national technical so-

Edward W. Bauman, managing director and secretary of the National Slag Association.

cieties (A.S.T.M., A.C.I., H.R.B., etc.) is an important duty, said Mr. Lewis, and this includes getting slag specified along with other aggregates. Contacts with federal agencies concerned with aggregate specifications and research are also important. He cited instances concerning specifications for slag as concrete aggregate, staining of slag block when painted, and hardening and cracking of bituminous pavements.

Committee Reports In the report for the Research and Product Development Committee, its chairman, Stewart H. Steffey (U. S. Steel Co.), told of the recent meeting of that group. A feature was a 150-page book, which was researched and written by George Bartholomew of this firm, summarizing past researches. Several development projects are being considered, and he obtained authority for the executive committee to approve necessary action on such work. His company has been shipping open-hearth slag from several plants for ballast and road work, chips for black top, etc. All the blast-furnace slag being made is being sold, and some old banks are being used up at a rapid rate.

The report of the Technical Committee was given by its chairman, Howard T. Williams (Midland Slag Co.). At its first meeting, held in Washington in January, several committees were appointed to study special problems. The next meeting was scheduled for November 8 and 9, 1961, at the Sheraton Cleveland Hotel, Cleveland, Ohio.

The Advertising and Publicity Committee, according to its chairman, Walter B. Evans (American Materials Corp.), feels that the present advertising and publicity program needs to be supplemented. The possibilities for a colored moving picture are being investigated.

Other Activities Most of those in attendance and their wives took full advantage of the facilities of this famous mountain resort. Many played the sporty golf course, and a feature was a putting tournament on the equally sporty 18-hole putting course. Prizes for a ladies' tournament at the latter were awarded at a joint luncheon at the Pocono Manor Club.

The annual banquet was presided over by George A. Mattison Jr., who coupled his wide experience as a speaker with an excellent repertoire of stories. The featured speaker, the Rev. Clarence A. Rohn, an outstanding authority on the background of Pennsylvania Dutch folklore, was interesting and humorous.

The final day of the meeting was reserved for an inspection of the new multimillion-dollar research laboratory of the Bethlehem Steel Co. Prior to the tour, Mr. and Mrs. H. T. McIlwain of that company were hosts at a luncheon at the famous Saucon Valley golf course.

Refractory Products Listed In '61 Industry Directory

The *1961 Product Directory of the Refractories Industry* in the United States, just published, lists 3,548 different brands of refractories for linings of industrial furnaces. This represents a 24 percent increase over the number of references in the 1958 directory. The volume contains 224 pages and covers almost the entire refractories industry.

The new directory is available at $4.50 per copy from The Refractories Institute, First National Bank Building, Pittsburgh 22, Pa.

Mining Industry's Future Reviewed At Inter-American Conference

Marling J. Ankeny, director U.S. Bureau of Mines, who delivered an address during the seminar.

Nelson C. White, vice-president, International Minerals & Chemical Corporation, seminar chairman.

AN important and outstanding feature of the International Trade Fair held recently at McCormick Place, Chicago, Ill., was the Mining Seminar of the Inter-American Industries Conference. International Minerals & Chemical Corporation was host for the seminar meetings which were attended by approximately 70 representatives of mining and related processing industries in the Western Hemisphere.

Chairman of the mining seminar was Nelson C. White, vice-president —planning, IMC, who is also chairman of the Canadian-American Trade and Industries Committee of the Chicago Association of Commerce and Industry. Internationally known mining authorities who presented principal addresses during the seminar included Marling J. Ankeny, director, U. S. Bureau of Mines; V. C. Wansbrough, vice-president and managing director, Canadian Metal Mining Association; Daniel Kuri Brena, Subministry of Natural Resources, Mexico; and Jose Campillo, president, Mining Chamber of Mexico.

In his welcoming remarks, Mr. Nelson noted that the reason for and objectives of the seminar are that mining of one kind or another is common to and important in all the Americas, and that the seminar could be an important tool in the job of encouraging the flow of ideas, materials, and money between the nations of rich resources and the nations with the markets.

Within the group of nine countries which produce 70 percent of the world's mineral wealth, five represent the world's leading industrial nations. Apparently then, Mr. Nelson stated, those five are the only ones that are endowed with the perfect combination—enough resources for useful mineral production and also the coal and iron to develop industrially.

That pinpoints the problem, he added, *i.e.*, what's in the future for nations not so well endowed? Possibilities noted included alliance with other nations—or individuals in those nations—in joint ventures that would achieve the needed balance. Otherwise, Mr. Nelson said, it seems that the long-range future of less well endowed countries includes the possibility of becoming satellites to other nations—if not voluntarily, then involuntarily.

In Mr. Nelson's view, joint ventures, meaning the pooling of capital obtained both from within and without the country owning the natural resources, are the best procedures. These, he emphasized, should rely heavily on the private sector of the economy, under reasonable government regulation, and should thus result in the fastest and fairest type of development.

Mr. Ankeny, in referring to several important facets of fundamentally important co-operation between the countries of the Western Hemisphere, noted that among these nations there is an interdependence. There must be a willingness on the part of citizens in each country to give assistance where it is needed, and there must be a willingness on the part of those receiving such assistance to put forth their own best efforts for self-help.

Governments of the Americas, he said, must take the necessary social and political steps to mobilize the full human and material resources of their countries for future development. Both governments and private investors, it was added, must be willing to seek the most appropriate ways of financing mineral industry ventures. Further, those countries with technical knowledge must be willing to train those who need their knowledge.

Capital for resource development is a critical problem, Mr. Ankeny conceded. The obvious alternative to loans, gifts, or similar assistance is to encourage both foreign and domestic investment. Investment capital does not respect international boundaries, it was pointed out. Despite the fact that the United States is normally an exporter of investment capital, many foreign investors have sizable holdings in United States based companies.

On the subject of mining codes, a topic of prime interest to the seminar, Mr. Ankeny noted that the history of the United States and other industrialized nations teaches that mineral and fuel resource development is basic to industrial growth. Failure to achieve such development often results from insufficient capital and technical knowledge—which in turn is inhibited by outmoded laws and regulations.

A country's mining code is an important part of the operating environment of a mining enterprise. Therefore, Mr. Ankeny emphasized, when codes are archaic, they must be revised to reflect modern philosophies. In conclusion, he noted that codes should not, as far as possible, permit varying interpretations as national politics change; and, perhaps most importantly, they should encourage private investors to take part in mining ventures.

Hard-to-Analyze Minerals Yield to THERMAL ANALYSIS

By DAVID S. SMITH

ANALYTICAL equipment for rapid determination of clays, gangue, alteration products, and other difficult-to-analyze minerals, some uranium ores, and oil shales, can be built from run-of-the-mine minerals and a few local purchases. Application of the equipment in various nonmetallic fields, including cement, lime, chemical raw products, and refractories, is summarized in an accompanying table.

The method—differential thermal analysis (DTA)—measures temperatures of exothermic and endothermic reactions, gives a quantitative analysis, and indicates transformation points in minerals and metals. Much of this information cannot be obtained by chemical or X-ray diffraction.

It should be noted that DTA is not regarded as a complete substitute for X-ray diffraction. For example, the exact position of atoms in a mineral molecule cannot be determined with DTA, but this can be done with X-ray diffraction. On the other hand, both methods are applicable in analyzing materials to determine which specific minerals they contain, and also in determining the particular mineral variety of unknown samples.

The advantage of DTA becomes most apparent in day-to-day mineralogical analysis, particularly of complex silicates. X-ray diffraction results are frequently difficult to analyze, but the results of differential thermal analysis are readily apparent. In addition, there is only a nominal cost involved in the latter.

DTA determines a range of reactions from loss of absorbed water and water of crystallization, release of the OH^- radical from the crystal lattice, devolatilization of coals and oil shales, transitions of the crystal lattice such as α to β quartz, loss of CO_2 from carbonates, to oxidation of sulphides and uraniferous shales.

Simple Thermocouples The basis of DTA is comprised of simple and differential thermocouples. Simple thermocouples are composed of two metal wires of different composition welded butt to butt (Figure 1). The two free ends are connected through leads to a millivoltmeter or other suitable recorder. When the junction between the two wires is at a higher temperature than the ends, a current will flow.

Thermocouples are easy to make. Twist two dissimilar wires around each other two or three times. Snip off any excess and clip one free end onto one strand of a 110-v. a.c. circuit; then quickly dip the twisted ends several times into a metal bowl of mercury connected to the other end of the circuit. This will burn back excess wire until it is butt-welded.

The metal bead formed between the wires should be as small as possible. Proper choice of wires will give a thermocouple with an electromotive force that is directly proportional to the temperature difference between the heated junction and the ends. Chromel-Alumel thermocouples give a straight-line relation, reproducibility, constant calibration, and reasonably large emf per degree of temperature difference at low cost (Figure 2). Chromel-Alumel thermocouples measure furnace and sample holder temperature.

Chromel is 90 percent Ni and 10 percent Cr, while Alumel is 94 percent Ni, 2 percent Al, 3 percent Mn, and 1 percent Si. These alloys are common materials for thermocouples and should not be difficult to buy. Fine (22-gauge) thermocouple wires are recommended.

ABOUT THE AUTHOR

■ A graduate of Columbia University, David S. Smith completed additional work at the Colorado School of Mines. He is presently an account executive with the New York office of Burson-Marsteller Associates, an industrial and financial public relations organization. While at Columbia, Mr. Smith designed and built three of the differential thermal analyzers described in this article, and also a special inert atmosphere model for running samples of uraniferous shales under helium. The above work resulted in the award of an AEC fellowship for advanced research in mineralogy. In addition to the research activities, Mr. Smith's background includes prospecting, and employment as a mucker, powder monkey, and timber man on mining properties in Colorado.

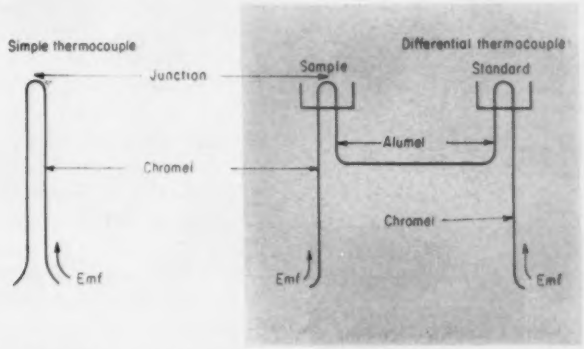


FIG. 1—The standard (simple) thermocouple (left) produces a voltage which is proportional to the heat at the thermocouple junction. It is made of Chromel and Alumel wires butt-welded at the junction.

The differential thermocouple (right) measures the voltage difference between two thermocouples; it is essentially two standard thermocouples placed "back-to-back." If the temperature in both the sample and standard components is equal, the emf's cancel. If the sample heats faster or slower than the standard material, a current flows to the right or left. The current's emf is proportional to the temperature difference between the reacting sample and the inert standard—giving a method for measuring chemical reactions in the sample.

Differential Thermocouples The second type of thermocouple used in DTA is a differential thermocouple. It is much like a simple thermocouple but is designed to measure temperature differences between a sample and a standard inert material.

Differential thermocouples have two junctions butt-welded in the series Chromel-Alumel-Chromel or Alumel-Chromel-Alumel (Figure 1). Emf's of two opposed junctions will cancel out unless the tip of one thermocouple is receiving more heat than the other. If one junction is placed in the sample and one in an inert standard such as powdered alumina (Al_2O_3), emf differences between the sample and standard are measured, and endothermic or exothermic reactions are detected.

When an exothermic reaction occurs, the sample-thermocouple receives more heat than the standard thermocouple, causing upward deflection of the thermal curve. Endothermic reactions lower the curve. At transition points the sample heats up at a rate different from that of the standard, and small transformations of the crystal lattice are detected.

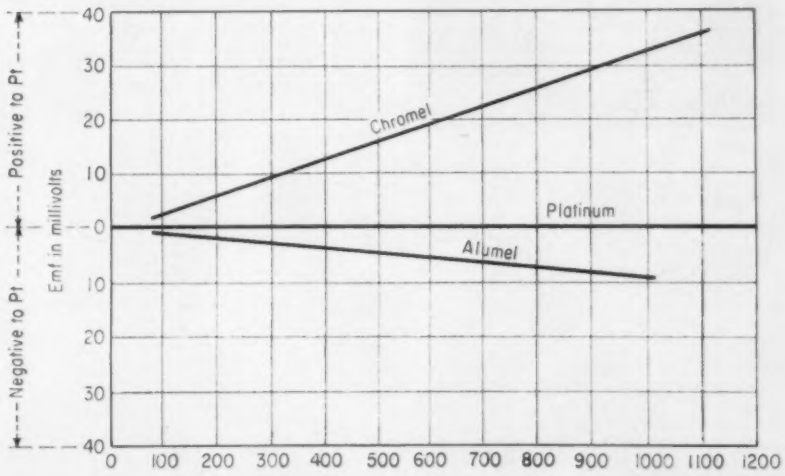


FIG. 2—Plotting of the voltages of standard Chromel and Alumel thermocouples produced with a platinum wire. When a thermocouple is made of Chromel and Alumel, eliminating the platinum, the voltage difference for selected temperatures can be read directly from the chart as the difference in emf's between the Chromel and Alumel curves. (Emf is plotted on the vertical scale, while temperature in degrees C. is plotted on the horizontal scale.) The chart shows how thermocouples give a straight-line relationship between voltage and increasing temperature.

Six-Sample Unit The DTA design on page 96 is the product of the mineralogy department of Columbia University. DTA was originated at Columbia by Professor P. F. Kerr and Professor J. L. Kulp, and the work was extended by the former and Professor R. J. Holmes.

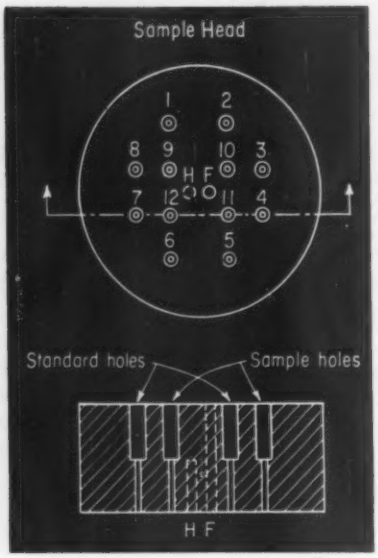
A sample holder or sample head is machined from heat-resistant chrome-nickel steel alloy and designed to make six separate analyses at one time (Figure 3). The head is cylindrical, 3 in. in diameter and 2 in. thick.

Twelve holes of ½-in. diameter are spaced over the flat surface and drilled to 1-in. depth. Countersunk in the ½-in. holes are 12 ⅛-in. holes drilled completely through the head for differential thermocouples.

A hole of ⅛-in. diameter is drilled through the center of the head for a furnace-temperature thermocouple. On the other side of the head, about ¼ in. off-center, a ⅛-in. diameter hole is drilled 1 in. into the sample block for the head-temperature thermocouple. The head is then mounted on a hollow cylinder of alumina (sintered Al_2O_3) about 10 in. high and centered in the furnace.

After thermocouples have been

FIG. 3—Stainless steel sample head designed for running six separate samples at one time. Even numbered holes hold the sample, odd numbered holes hold the alumina standard. "H" is the standard head, and "F" is a standard thermocouple to measure furnace temperature. Together, they are used to regulate furnace heating rate. Essential elements of any sample head are: at least one sample hole and one standard materials hole, and a head-temperature thermocouple to show the temperature of the standard material.



insulated with alumina spaghetti, they are cemented into sample holes with a mixture of finely powdered alumina and sodium silicate (water glass). Welded junctions of sample thermocouples must be centered vertically in the holes and an equal distance from the sides or they will heat unevenly.

Samples are prepared by dry grinding to minus 50-mesh. Little other preparation is necessary so long as the sample is dry.

Sample holes are filled with the powdered sample and the standard-holes with alumina of minus 60- to plus 200-mesh. Each standard-alumina-thermocouple is paired off with a sample-thermocouple. Packing sample or standard in the holes has little effect. A single insulated thermocouple is then cemented in the block for the head temperature and another through the block for furnace temperature.

An excellent furnace (Figure 4) can be built from a 5-gal. paint can with both ends replaced by tough insulating board. A central alumina muffle is placed in the furnace and wrapped with helical Nichrome wire. Heavy gauge Nichrome provides longer furnace life. Empty spaces between the central core and outer furnace are packed with calcined diatomite or bubble alumina for insulation.

The furnace unit is mounted in a metal frame of black pipe, so that the unit can be raised when the sample head is serviced. After making a run, the furnace is raised and the holes are blown out with compressed air. If the sample cools too long before blowing, it may cake in the holes.

The Columbia system incorporated a Leeds & Northrup "Micromax" program controller connected to the furnace-temperature thermocouple for heating-rate control. Furnace temperature can be raised or lowered from 0 deg. to 50 deg. C. per minute and will automatically hold the sample at any desired temperature. In tests, heating rates of 12 deg. C. per minute were found to give the most clearly defined peaks. Furnace temperatures seldom were run above 1050 deg. C., since high temperatures reduce thermocouple and furnace life.

Recording instruments range from a millivoltmeter to multivariable recorders, depending on the budget and the need for permanent records. In Columbia's system, d.c. current from thermocouples is led to a preamplifier, which boosts the signal to recordable levels, and then is channeled to a Leeds & Northrup "Speedomax" six-variable, high-speed, high-sensitivity electronic recorder with a maximum range of 3 millivolts. Chart speed is synchronized with the program controller. Permanent records are valuable for comparison of known samples with unknowns.

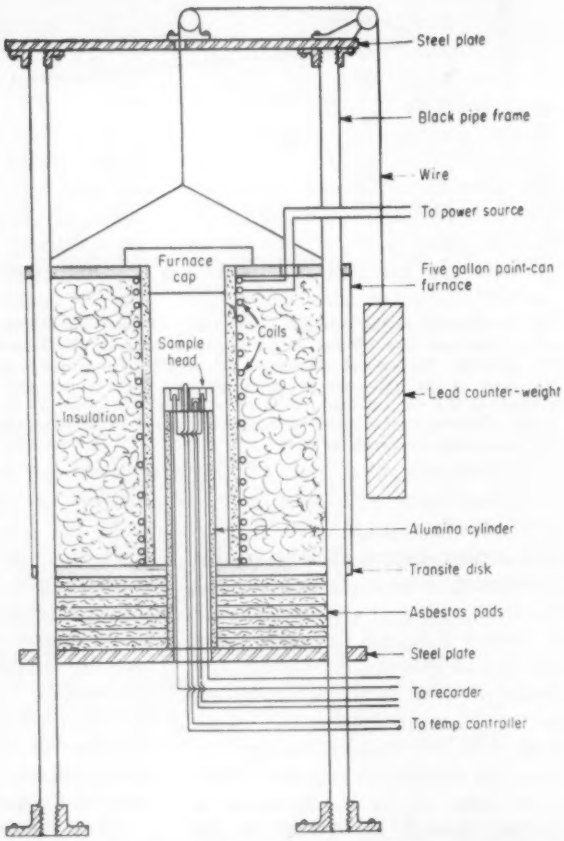
Standard procedures are followed in describing thermal curves.

(1) Peaks are measured up or down from a straight line with endothermic down and exothermic up.

(2) Furnace temperature is noted along the horizontal axis.

(3) Peak height is the temperature difference between the two points where the curve begins and ends. Area is proportional to the amount of thermally active mineral involved.

FIG. 4—A paint-can furnace can be built in the shop. It is designed to be raised or lowered when the sample head needs servicing. The lead counterweight balances the system. Wires lead to recording instruments (such as a voltmeter and temperature gauges). When a run is completed, sample and standard are blown out of the holes with compressed air or saved for further studies.



Quantitative analysis is carried out by measuring the area under a selected curve and dividing by the area under the equivalent curve for a pure sample run with the same equipment. This gives the ratio of the mineral in a mixed sample.

Thermal Curves There are at least five deflections that occur on a thermal curve (Figure 5—*Encyclopedia of Chemical Technology*).

(1) Broad, low endothermic curves between 100 and 300 deg. C. indicate loss of absorbed water.

(2) Broad asymmetrical exothermic curves show oxidation of organic matter in clays between 400 and 500 deg. C.

(3) Loss of lattice water between 450 and 700 deg. C. gives symmetrical large-amplitude curves with a broad base.

(4) Carbonates show large asymmetrical deflections between 450 and 900 deg. C.

(5) Narrow, high-amplitude exothermic peaks of the clay minerals corresponding to transformation of amorphous alumina to α-alumina which will occur near 1,000 deg. C.

Figure 6 shows typical clay curves (*Encyclopedia of Chemical Technology*).

In the graph, clay minerals show their characteristic sharp peak at 980 deg. C., where amorphous alumina adjusts to the α-alumina form. From the curves it is possible to distinguish definitely between the three kaolin minerals—nacrite, dickite, and kaolinite. Anauxite has a curve similar to kaolinite except for a slightly smaller area under the endothermic peak. This peak is due to decomposition of lattice into amorphous silica and alumina. Halloysite can be distinguished readily from other kaolin minerals because of two low-temperature peaks at 150 to 325 deg. C. Allophane is so fine-grained that it is sometimes considered amorphous. As a result, both of the peaks at 180 deg. C. and 510 deg. C. have long bases and are not so clearly defined.

Montmorillonite minerals are thought to have a symmetrical sheet structure similar to pyrophyllite and are characterized by a double endothermic peak.

Talc gives a clear endothermic peak at 990 deg. C. The high temperature of this main endothermic peak shows the great strength of the OH^- bonds in the talc crystal lattice. Gibbsite has large heat absorption at 350 deg. C., which is to be expected, due to its high water content (more than twice that of the kaolin minerals). Diaspore gives a single definite peak at about 550 deg. C.

Gangue Minerals Curves of common gangue minerals are shown in Figure 7.

Quartz has a phase inversion from α to β quartz at 575 deg. C.; calcite exhibits its usual endothermic peak with the loss of CO_2 between 800 and 900 deg. C.; and dolomite ($CaMgCO_3$) shows two peaks, one for the loss of CO_2 from the Mg ion and one from the Ca ion.

As an example of a mineral mixture, Figure 8 is an analysis of two limey shales, high in sulphides and soluble salts.

The curves indicate that shale A had most of its carbonates in the form of dolomite. In shale B, limestone was more abundant. This is shown by the double endothermic reactions that occurred between 700 and 900 deg. C. in A and the single large peak between 800 and 900 deg. C. in B.

The exothermic reaction peak between 400 and 500 deg. C. is due to combustion of carbonaceous ma-

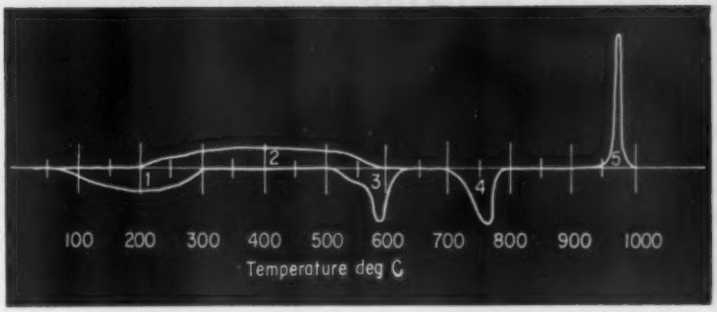


FIG. 5—This composite differential thermal curve illustrates the possible reactions that are commonly recorded with DTA equipment. Endothermic peak #1 indicates loss of absorbed water. Exothermic peak #2 shows oxidation of organic matter. Peak #3 indicates loss of water of crystallization attached chemically to crystal lattice. Peak #4 indicates carbonates being converted to CO_2 (calcined). Narrow, high-amplitude exothermic peaks (#5) of clay minerals correspond to transformation of mineral lattices to forms that are stable at high temperatures.

Industry	Application	Comments
Cement Clay Lime	Prospecting, assaying, mine evaluation, and mapping deposits; excellent for quality control.	In general, use DTA for run-of-mine investigations. X-ray diffraction is best for detailed studies, or for special problems or minerals not thermally active.
Chemical raw products except sulphides and sulphur, arsenides, and related compounds and organic materials.	Prospecting, assaying, mine evaluation, and geologic mapping, some quality control, particularly with carbonates.	Applies mainly to thermally active minerals, as outlined in text *(i.e.)* those that break down, oxidize, form high-temperature crystal inversions, etc. Sulphides and arsenides destroy thermocouples and require special ceramic sample holders, as outlined in text. For this reason, many organic deposits such as coal and bitumens cause trouble.
Refractory minerals	DTA is of little value except in determining gangue minerals, as in geologic mapping.	Nature of refractory minerals more or less eliminates them from consideration for thermal analysis.

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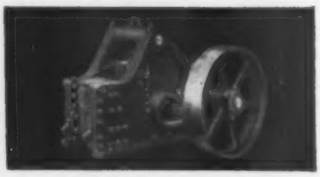
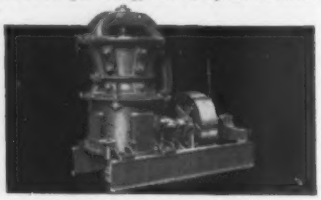
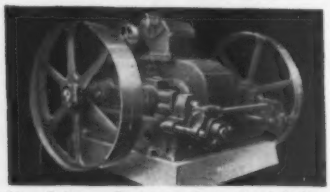


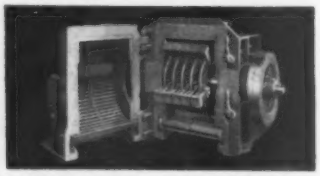
Jaw Crushers — Produce coarse (5 in. largest model) to fine (⅛ in. smallest model). Eight models range from 2 x 6 in. jaw opening (lab model) to 12 x 26 in. Capacities to 30 tph. All except two smallest sizes operate on double cam principle — crush double per energy unit. *Request Bulletin No. 062.*



Rotary Fine Crusher — Reduce soft to medium hard 3 to 8 in. material down to ¼ to 1¼ in. sizes. Capacities up to 30 tph. Smallest model has 6 x 18 in. hopper opening; largest, 10 x 30 in. Non-clogging operation. Single handwheel regulates size. *Request Bulletin No. 063.*



Crushing Rolls — Reduce soft to hard 2 in. and smaller materials to from 12 to 20 mesh with minimum fines. Eight sizes, with rolls from 8 x 5 in. to 38 x 20 in.; rates to 87 tph. Three types — Balanced Rolls; Plain Balanced Rolls; Laboratory Rolls — all may be adjusted in operation. *Request Bulletin No. 065.*



Hammer Mills — Reduce to 20 mesh. Swing-Siedge Mills crush or shred medium hard material up to 70 tph. Hinged-Hammer Pulverizers crush or shred softer material at rates up to 30 tph. Four Swing-Siedge Mills with feed openings from 6 x 5 in. to 20 x 30½ in. Four Hinged-Hammer Pulverizers with feed openings from 12 x 12 in. to 12½ x 24 in. *Request Bulletin No. 084.*

**Reports Manager W. Carleton Merrill concerning Sturtevant Swing-Sledge Mill at James F. Morse Co., Boston.*

STURTEVANT
MILL COMPANY
104 Clayton St., Boston 22, Mass.

Enter 98 on card, page 149

terial and to the oxidation of marcasite. Between 100 deg. C. and 150 deg. C. there is an exo-endothermic reaction that cannot be attributed wholly to dehydration of the shale. Dehydration of mechanically held water never occurs exothermically in clays. Such a reaction is indicative of tridymite quartz. Neither curve shows the reaction of large amounts of clay mineral, but this is typical of illite shales that contain less than 50 percent illite.

Many variations exist on the general DTA scheme. Oxides, sulphides, and arsenides react with thermocouples and often ruin them with one run. Organic impurities mask other reactions when they are oxidized.

The sulphide problem is combated by using ceramic cups for samples with a tiny central nipple over the thermocouple.

Curves for uraniferous shales are normally masked by oxidation. The problem is solved by running them under an inert gas such as helium in an air-tight bomb.

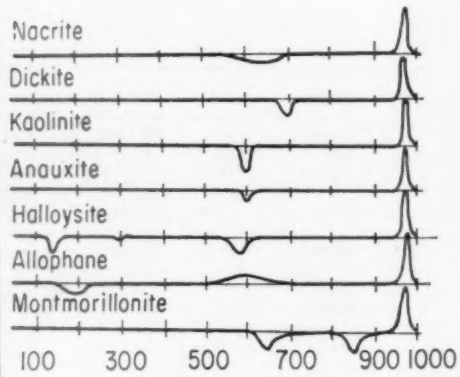


FIG. 6—Typical DTA curves are shown for common clay minerals. Although it is often impossible to analyze in hand samples or under the microscope, each mineral shows up clearly with a specific differential thermal curve. By running known samples and comparing these curves to unknown curves, hard-to-analyze minerals may rapidly be identified.

FIG. 7—Curves for common minerals that are often found in clays and shales. The goethite curve results from loss of water attached to mineral lattice at a little over 300 degrees C. Quartz changes its crystal structure at 575 degrees C., as shown in the second curve. Calcite loses CO_2 to the atmosphere between 800 and 900 degrees C., and dolomite ($CaMgCO_3$) loses CO_2, first from the magnesium, then from the calcium atoms at the two separate temperatures shown on the bottom graph. Quantitative analysis is made by measuring the area under curves and comparing them to known sample analyses.

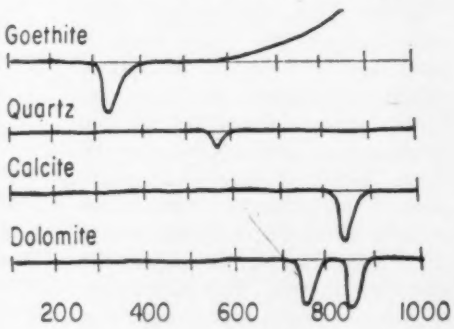
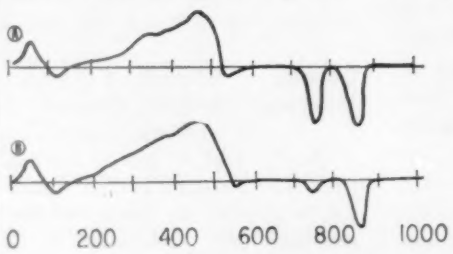


FIG. 8—DTA curves for two separate shales. They are composite curves, made up of the individual DTA curves for their separate mineral components. Both shales have large quantities of carbonates, but B, the bottom shale, contains them in the form of calcite, while A, the top shale, contains dolomite. These types of curves can materially help in correlating unknown shale samples that may or may not be from the same strata. Correlation methods of this type are often used in prospecting for petroleum. The method generally works on any material that chemically changes or breaks down under heat.



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Financial Ratios: CLUES to BUSINESS HEALTH

- **The success or failure of a business is not measured by a single ratio, as some businessmen believe.**

By CHARLES C. MOFFAT
Certified Public Accountant

MOST businessmen, including operators of small businesses, are familiar with the basic facts which are shown by figures in their Profit-and-Loss Statements and Balance Sheets. What may not be so well known, however, is the fact that important clues to the health of a business may be found in these accounting records, if one understands how to evaluate the ratios that exist between various figures they contain.

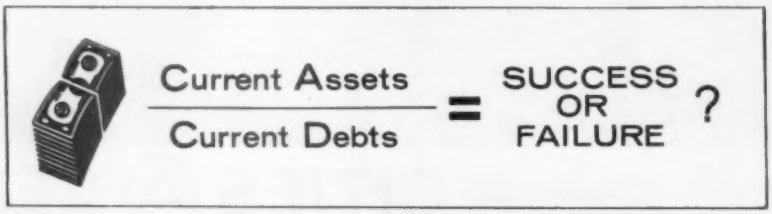
For example: the relationship between Current Assets and Current Debts has for years been considered the key ratio with which to measure success or failure. A business that has twice as many Current Assets as it has Current Debts is considered to be sound. However, it can be shown that this is just one of several ratios that need to be considered to determine the true overall condition of a firm.

The success or failure of a business is not measured by a single ratio, as some businessmen believe. A good relationship must exist between a number of other factors, to result in continuing success or to locate trouble areas that may be developing in a business. Some of these other important factors are here discussed.

Current Assets to Current Debts

The ratio of Current Assets to Current Debts is calculated with figures from the Balance Sheet. The total of Current Assets is divided by the total of Current Debts. For instance: with Current Assets of $60,000 and Current Debts of $20,000 there would be a ratio of 3 to 1, Assets to Debts.

Current Assets includes all cash, accounts receivable, notes receiv-



able, prepaid items such as insurance, inventory, and municipal, state and federal securities valued at the current market. Any reserve that has been established for bad debts is deducted from this total figure.

Current Debts represents the total of everything owed that is due and payable within one year. Long-term notes are not included, and only the portion of other notes that are due within one year are included in this figure.

The Acid Test Ratio

Most accountants make what they call the "acid test" to judge the liquid position of a business. This is determined in the same way as the Current Assets to Current Debts ratio, with one exception. In determining the amount of Current Assets, the inventory figure and the prepaid items are eliminated. All other asset figures previously listed are used except inventory and prepaid items.

The reason this is called the "acid" test is that with the elimination of inventory from the calculations there results a picture of how the company would stand if sales evaporated. Inventory would be changed into cash or accounts receivable when sales were made. The "acid" test shows what would happen if sales did not materialize. Prepaid items cannot be converted into cash to pay Current Debts, so they are eliminated.

Net Profits on Net Sales

Net Profits on Net Sales has long been considered another key ratio to use to measure the profitability of a business. But with the increased emphasis on a higher rate of inventory and capital turnover, this ratio must be considered in the light of the other ratios, particularly the net profit on the tangible net worth ratio, discussed later.

To obtain this ratio, Net Profits are divided by Net Sales. For example: with Net Profits of $10,000 and Net Sales of $200,000 there is a 5 percent profit on the sales figure.

Net Profits for this calculation are determined after taxes. Thus, the Net Profit before taxes in the foregoing illustration would be higher. Net Sales includes all sales less any returns, allowances, and discounts shown on the Profit-and-Loss Statement.

Net Profits on Tangible Net Worth

More and more financial advisers are looking closely at the figure representing Net Profits on Tangible Net Worth to determine the true profitability of a business. This figure provides a clue to the amount of money available for the future growth and development of the business. It also indicates the amount of money that can safely be withdrawn, or distributed in dividends.

To calculate this percentage figure, both the Profit-and-Loss Statement and Balance Sheet are used. From the Balance Sheet is subtracted the total of all liabilities from the total of all assets. Next are deducted such intangibles as good will, organization expenses, etc. This gives the Tangible Net Worth figure.

Divide the Net Profits (after taxes) figure by the Tangible Net Worth. For example: with net profits of $10,000 after taxes and tangible net worth of $100,000, there would be a relationship of 10 percent; that is, profits are 10 percent of net worth.

Current Debt to Tangible Net Worth

If Current Debt is equal to or higher than Tangible Net Worth, a company is in an unfavorable credit position. A quick check of this ratio will indicate what should be done to improve this situation.

This ratio is calculated by dividing the Current Debt figure (all liabilities falling due within one year) by the Tangible Net Worth figure. For example: with Current Debt of $20,000 and Tangible Net Worth of $100,000, debts are 20 percent of worth.

Net Sales to Tangible Net Worth

This ratio shows how rapidly capital is turning over and is an indication of the efficient management of the investment in the business.

This ratio is obtained by dividing Net Sales by Tangible Net Worth. For example: with Net Sales of $200,000 and Tangible Net Worth of $100,000 there would be a sales-

CAPSULE SUMMARY OF BASIC RATIOS

- $\frac{\text{Net Profits}}{\text{Net Sales}}$
- $\frac{\text{Net Profits}}{\text{Tangible Net Worth}}$
- $\frac{\text{Current Debt}}{\text{Tangible Net Worth}}$
- $\frac{\text{Net Sales}}{\text{Tangible Net Worth}}$
- $\frac{\text{Net Sales}}{\text{Inventory}}$
- $\frac{\text{Credit Sales}}{\text{Collection Period}}$
- $\frac{\text{Net Profits}}{\text{Net Working Capital}}$
- $\frac{\text{Net Sales}}{\text{Net Working Capital}}$

• When these financial ratios have been calculated, management will see the business through the eyes of a financial adviser. When checked with ratios for past years, they give valuable indications of whether a financial problem is developing.

to-worth ratio of 2 to 1.

If capital is being turned over too slowly, there are some funds that are not working properly. Perhaps by removing some of these funds from the business (especially if in cash), they can be made more productive in other types of investments. On the other hand, if capital is being turned over too rapidly, liabilities are apt to build up excessively, as the amounts owed to creditors are substituted for permanent capital investment.

Net Sales to Inventory

The Net Sales to Inventory figure is often referred to as Stock Turnover and it provides a clue as to whether sales are being lost because stock is too skimpy or because inventory is top-heavy, obsolete, or stagnant.

This ratio is calculated by dividing annual Net Sales by the Inventory figure on the Balance Sheet. It represents a ratio of stock to sales and can be compared with operations of previous years, to determine any improvement or decline in operations.

For example: with net sales of $200,000 and an inventory figure of $50,000, there would be a stock turnover rate of 4. A more accurate figure is obtained by taking the book inventory of each month, dividing by the number of monthly figures used, and dividing this average inventory into annual net sales. This eliminates any peaks and valleys that may not be revealed in the year-end inventory figures shown on the Balance Sheet.

Collection Period

The collection period figure can be calculated by dividing annual credit sales (total sales less cash sales) by 360 days. This gives a figure representing the average daily credit sales. This figure is then divided into the total of accounts and notes receivable.

For example: with credit sales of $180,000 divided by 360 days there results an average daily credit sales figure of $500. If the total receivables shown on the Balance Sheet is $15,000, the collection period is 30 days—$15,000 divided by $500.

When this ratio is determined, it will be apparent that there should be either an increase in collection efforts or a change in credit terms. As a general rule, this figure should not be more than 10 days longer than the net selling terms provide. For example: with terms of "net 30" the figure should not be more than 40.

Net Profits on Net Working Capital

Working Capital represents the margin that is available for carrying inventories and accounts receivables and for financing normal operations. The amount of Net Working Capital is determined by subtracting all Current Debts from Current Assets.

The ratio of Net Profits on Net Working Capital is calculated by dividing Net Profits (after taxes) by Net Working Capital. For example: with Net Profits (after taxes) of $10,000 divided by Net Working Capital of $40,000 there results a figure of 25 percent, which represents a higher-than-average figure.

Net Sales to Net Working Capital

The ratio of Net Sales to Net Working Capital is obtained by dividing the former by the latter. For example: using the figures that have been used for illustrative purposes in the foregoing, there would be a Net Sales figure of $200,000 divided by a Net Working Capital figure of $40,000 for a ratio of 5 to 1 of sales to working capital.

The higher this ratio figure, the more a business depends upon credit granted by suppliers and by the bank. When there is more money available for current operating funds, this ratio will be a lower figure, and it will be found that there is more independence in the financial aspects of the business.

Comparison of the Ratios

When the ratios outlined in the foregoing have been calculated, a better picture of the business will be available, and management will see the business through the eyes of a financial adviser or an accountant.

These ratios, by themselves, are not the complete answer to more successful management of a business. There is a need to compare the ratios that have been calculated. They should be checked with the ratios for past years. When any marked difference is noted, there should be an investigation to see whether a financial problem is developing that will lower future profits.

Ratios, if properly calculated, can be a road map to higher profits for a business. Use all the ratios, and use them wisely. **End**

Asphalt Institute, Refiners Allot $4 Million for Research

According to a recent survey of The Asphalt Institute's 49 American and Canadian member companies, a total of $4,412,700 is budgeted for product research in 1961. This figure reflects a 12 percent increase over last year. Institute members account for about 75 percent of the total asphalt output in the two countries.

The survey showed that petroleum refiners in the asphalt field now employ 249 scientists, engineers, and laboratory technicians in asphalt studies that range from basic investigation into the molecular structure of the material to new and improved applications of the refined product.

In addition to the refiners' program, the institute itself will spend more than $250,000 in research and development in 1961.

A CASE STUDY:

Geology for Nonmetallic Producers

By JOHN R. RAND
Consulting Geologist
John R. Rand Incorporated
Augusta, Maine

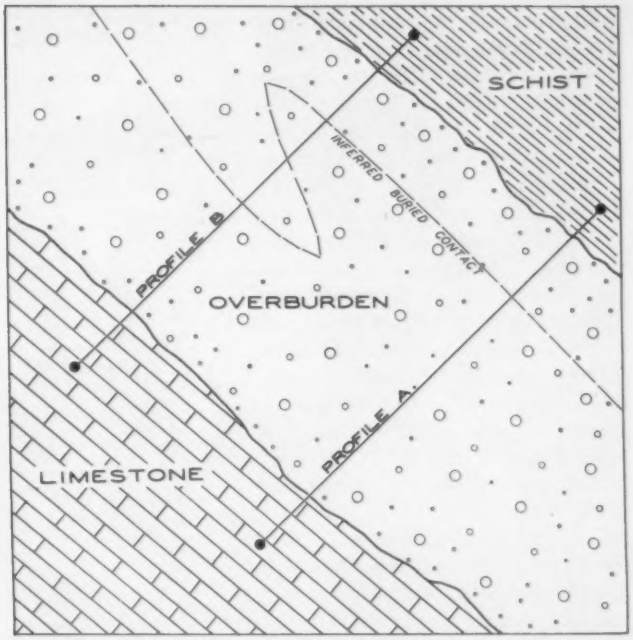


Fig. 1—A generalized geologic plan map, showing the location of magnetic survey lines and the inferred limestone/schist contact.

HISTORICALLY, industries engaged in extracting and processing nonmetallic or industrial minerals have not made wide use of geology in finding, proving, developing, or producing their many varied mineral and chemical commodities. While this feature may seem rather strange to the layman who might normally, through some instinctive sense, relate all rocks to all geologists, the situation may be explained, if possibly not justified, by the fact that few geologists have devoted their studies and attention to industrial minerals. Geologists teach, they work for federal and state agencies, they look for oil, they mine metals, but they rarely offer their services to the industrial minerals producer.

Gates and McGregor* recently published an article for nonmetallics producers, the first of its kind in too long, attempting to explain some of the ways by which geologists may be able to benefit these producers. The authors pointed out that geologists are trained in the procedures for locating mineral deposits; for analyzing mineral, chemical, and textural variations within deposits; for interpreting these variations in terms of both broad commercial value and detailed control of mining and processing.

In the specific exercise of locating mineral deposits, there are at least as many different search techniques as there are types of deposits to be sought, and individual geologists may differ somewhat, one from another, in their approaches to a given problem. Some types of deposits may be found and proved solely by geologic study supplemented by drilling; some may be found by a combination of geology and geophysics. The use of seismic techniques to outline gravel deposits, as well as to profile bedrock surfaces, with or without the aid of geologic interpretation, has been given considerable coverage.

With the notable exception of asbestos, most nonmetallic mineral deposits are not directly amenable to location by most of the geophysical techniques developed to aid in the exploration for metallic ores. Nonmetallic deposits are not electrical conductors; they are of similar specific gravity to that of the surrounding country rock; they do not contain magnetic minerals. They are probably most often discovered by their surface outcrops, and evaluated by outcrop sampling and drilling. Where deposits are hidden beneath a blanket of overburden, geologic mapping in the general vicinity can often develop sufficient evidence to suggest the reasonable possibility of a hidden deposit; but proof of its existence must depend upon exploratory drilling. Lacking a fairly accurate idea as to the areal limits of an inferred deposit, land acquisition can be risky and inefficient, and exploratory drilling, almost "wildcat" in character, very expensive.

A problem of this type—to locate the buried contact of a commercial limestone deposit—was "solved" by John R. Rand, Inc., by combining geology and geophysics. Since the technique has not, to the author's knowledge, been widely used in nonmetallics exploration, it may be of benefit to industry to know of the procedure.

The geology of the problem area involves metamorphic sedimentary rocks, including quartzite, quartzitic argillite, phyllite, and quartz-mica schist, enclosing a thick series of recrystallized carbonate rocks. These "limestones" are broadly layered in siliceous, magnesian, and calcareous zones, some of which have commercial potential as raw material sources for cement, agricultural limestone, or lime.

The entire meta-sedimentary assemblage is strongly folded, and the

*Targets for Geology, PIT AND QUARRY, July, 1961, page 193.

contact between the carbonate rocks and the country rock schists is believed to be steeply dipping to nearly vertical. Over an area of several hundred acres this contact is buried beneath several tens of feet of unconsolidated clay, sand, and gravel.

The surface in the area is primarily devoted to agriculture and dairy farming. To locate the limits of the carbonate rocks by conventional drilling would be unduly expensive, involving not only the cost of blind drilling, but also the cost of damage to the cultivated surface. Figure 1 shows the generalized surface geology, with the wide band of overburden obscuring the limestone/schist contact.

Geologic examination of the exposed rocks in the area indicated that although the carbonate rocks had no special characteristics that might distinguish them geophysically, the country rock schists appeared likely to contain magnetite or other iron-bearing minerals whose magnetic susceptibilities might be appreciably greater than anything in the carbonate rocks.

Accordingly, a series of parallel lines (Profiles "A" and "B," Figure 1) were laid off on an aerial photograph, to run across the covered contact from known limestone on one side to known schist on the other. The lines were oriented to be perpendicular to the believed trend of the contact. Instrument surveys were conducted along these lines to measure relative magnetic intensities across the zone, on the theory that the schist should display significantly greater magnetic intensities than the limestone, and that the contact could be pin-pointed beneath the place on each survey line at which there was an appreciable change in magnetic intensity.

Using a Sharpe Model A-2, vertical force magnetometer, readings were taken at 25-ft. intervals along the pre-determined survey lines. For the sake of speed, two men conducted the surveys: one to operate the instrument; the other to record the readings and simultaneously to tape off the 25-ft. station intervals using the aerial photograph as a line guide. Readings were then reduced arithmetically to "gammas," and plotted as profiles across the covered area. No corrections were made to relate lines run on different days to an absolute base, the object of the study being simply to locate significant changes in magnetic intensities along each individual line.

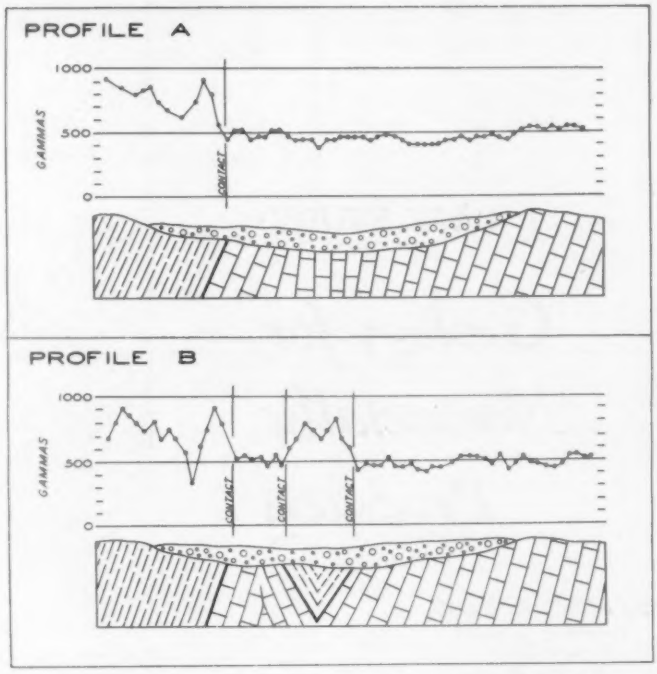


Fig. 2—Generalized geologic cross sections, showing magnetic profiles and the inferred limestone/schist contacts.

Figure 2 shows two generalized profiles over the area: "A" being a profile in which the contact is interpreted to be straight and simple; "B" being a profile in which the contact is interpreted as being compound or folded. In each case the contact is interpreted to lie beneath the point where magnetic intensities change radically. The dashed line on Figure 1 shows this contact zone in plan view, as interpreted from the profiles, with the fold structure further inferred from local geologic mapping.

Operating speeds for this type of survey will vary widely, depending upon terrain, the proportion of woods and swamps to open fields, the intervals between stations at which readings are taken, and the type of instrument employed. The survey described here completed about one mile of line per day in swamps and woods, and over two miles of line per day in open fields having only minor woods and swamp conditions. More portable instruments are now available with which it should be possible to run five or more line-miles per day under favorable conditions.

SUMMARY

While nonmetallics producers do not make as wide use of geologic services as their counterparts in metals and mineral fuels, the disparity may be explained in part by a lack of effort by geologists to describe ways by which geology may aid this branch of the industry. Geologic services can beneficially influence almost any phase of the business of transforming rock into money, from finding the mineral to paying taxes on its production.

As illustrated here, even geophysics can sometimes be of assistance in defining a nonmetallic deposit, by the reverse twist of delimiting the worthless country rock surrounding the nongeophysical mineral of value. Once delimited, the commercial minerals can be efficiently and economically explored and evaluated by standard drilling methods.

While the specific technique described here will certainly not work for many geologic areas underlain by limestones, the description shows how geologic analysis can develop a quick and inexpensive solution for a potentially expensive problem.

Ulland Bros. Add Second SKOOPER on 450,000-Yard Sand Fill Job

One SKOOPER sells another on job that is test of men and machines

Ulland Bros. put their first Koehring® 205 Skooper to work early in 1960 — used it on a variety of jobs in and around Duluth. Then the company was awarded a contract to move some 450,000 yards of dredged sand on the Duluth-Superior Bridge Project.

The job demanded two machines and Ulland set out to determine the most productive and profitable equipment for the contract. Several rubber-tired front-end-loaders were tested. Crawler models were ruled out due to the abrasiveness of the material. The Skooper served as a basis of comparison.

Water draining from the stockpiled material made loading conditions difficult. The de-watered material had a tendency to set-up, pack tight, become extremely tough to dig and move. For every two loads per front-end-loader, the Skooper dug and loaded three . . . put 15 to 16 tons in a truck on the average of 2 to 2¼ minutes. Even under the most adverse conditions the Skooper averaged between 233 and 250 yards an hour over a nine hour shift.

So . . . Ulland bought another Skooper.

Why? The Skooper's standstill dig, swing, dump cycling netted bigger payloads. Its 7-ft. level crowd coupled with its powerful hydraulic break-out force enabled the Skooper to load more — faster — than any comparable machine on the job. The Skooper proved without a doubt — there's nothing like it on wheels or tracks!

You can prove it, too! Put the Skooper through the paces at your nearby distributor. You'll be dollars ahead on your next loading contract.

K120

SEE YOUR KOEHRING DISTRIBUTOR

DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

Round consisted of 88 vertical 3½-in. holes drilled 68 ft. deep in three rows on 10 x 12 burden and spacing. Holes were loaded with 18,150 lb. of explosives.

Heavy Shooting, Multiple Delays in Quarry Result in BETTER BREAKAGE, LESS VIBRATION

ANOTHER P&D EXCLUSIVE

A COST-conscious New England stone producer has found a profitable solution to the problem of blasting vibrations in a congested area. This firm shoots heavily loaded holes in hard trap rock without hesitation. They use up to 30 firing delays, however, which gives them good breakage with a low average level of vibration.

The firm, Iafolla Crushed Stone Co., Inc., of Portsmouth, N. H., produces aggregates and bituminous concrete on a 200-acre property just outside the city limits. Established in 1945, Iafolla has always been careful of blasting vibrations; the nearest private property is only 1,500 ft. away, and a built-up area of restaurants, residences, and commercial properties is only 3,000 ft. away. Despite frequent blasting over the years, the firm has maintained good community relations. Whenever possible, blasting vibrations were minimized by relatively light loading.

In recent years, however, Iafolla's president, Ferris V. Bavicchi, has taken the position that light shooting has an unfavorable effect on the true cost of stone. For example, light shooting generally doesn't give good breakage. A great amount of stone must be broken up by secondary blasting. This extra cost and other hidden costs for subsequent processing are often excessive although the initial cost of explosives is low in terms of dislodging so much rock in a single shot.

According to Mr. Bavicchi, his firm is now convinced that the cost of stone "going out the gate" is what really counts — not initial

At the left is Robert J. Iafolla, vice-president, with Ferris G. Bavicchi, president of Iafolla Crushed Stone Co., Inc.

Right: Lawrence Fuller, Iafolla's general superintendent, discusses blast results with Atlas representatives R. B. Anderson (left) and Ned Hughes (right).

The Blast

Top:
Here's the working face before the May 10, 1961, shot. The face is 65 ft. high and about 400 ft. wide. Round will be fired using 88 millisecond-delay electric blasting caps in an aggregate of 30 delay periods.

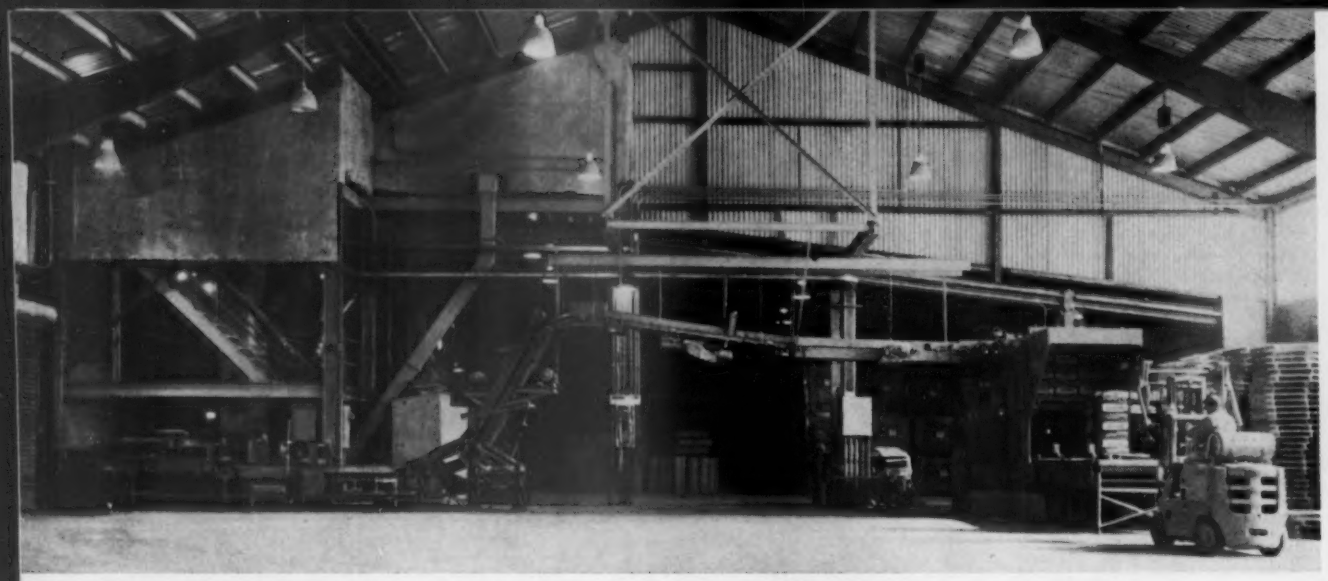
Center:
Firing sequence opens up the left side of the face first, displaying the advantage of millisecond-delay timing. No more than 610 lb. of explosives are detonated per delay. This keeps vibration low despite heavy loading per hole.

Bottom:
Excellent confinement provided by bottom initiation makes this muck pile easy to dig.

powder cost. Mr. Bavicchi says that savings in explosives may be drained off in higher costs for secondary breakage, crusher slowdowns, and lower production if a firm doesn't shoot for maximum breakage in the quarry. This is one area in which his firm is attempting cost reductions. Over the next 18 months the firm will carry cost reduction studies further by an analysis of lost motion at the plant, which is related to breakage in the quarry. Some of their ideas and objectives are to: (1) tighten up crusher clearance; (2) install a timer on the feeder to determine average running time between shutdowns; (3) keep the crusher full at all times, and (4) run all units at peak capacity.

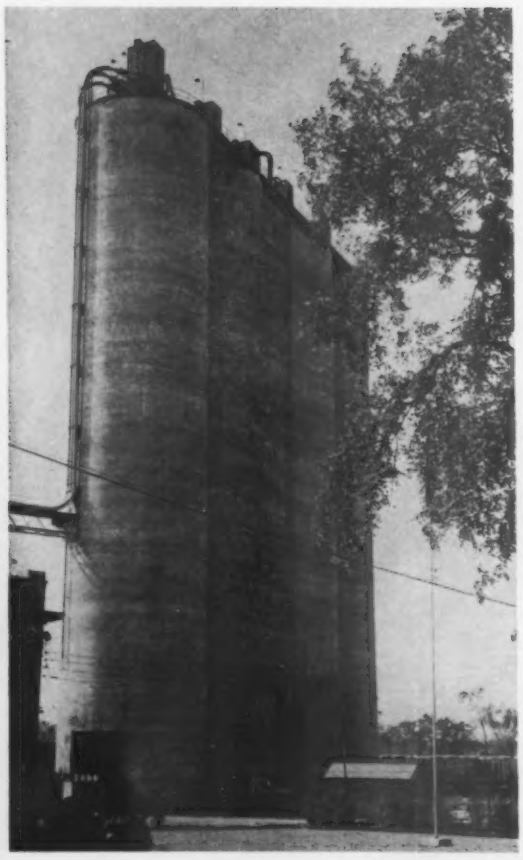
Within the last three years, increased production and better breakage have been major goals for the company. Assisted by representatives of Atlas Chemical Industries, Inc., Lawrence Fuller, general superintendent, has developed new blasting programs that permit heavier shooting and better breakage without an increase in troublesome vibrations. They are presently shooting twice a year, but the shots are two and three times larger than

(*Concluded on page* 111)



General view inside the packhouse, showing the packers (left) with a scale which rejects any underweight bags, and a bag flattener. An overhead conveyor feeds bags to the automatic palletizer (right).

Cement Packing and Shipping Facilities Modernized at GLENS FALLS



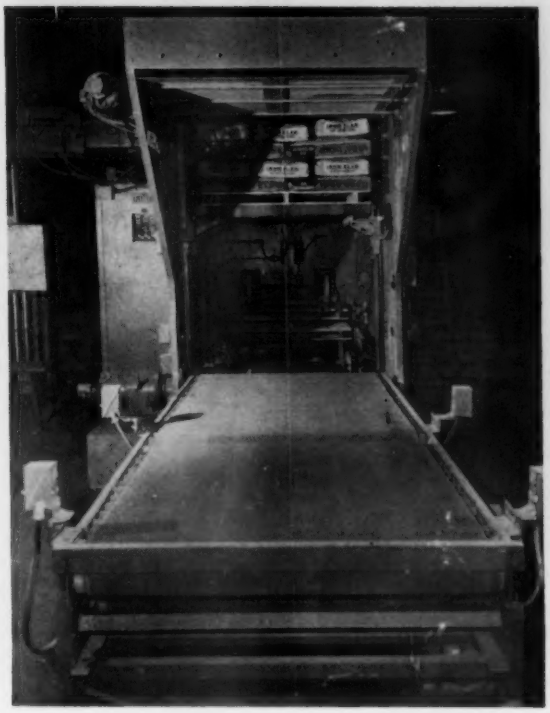
The four new silos for bulk-loading of cars and trucks have a total storage capacity of 93,500 bbl.

IN 1959, when it was apparent that cement shipment by trucks was to expand, The Glens Falls Portland Cement Company, a Division of The Flintkote Company at Glens Falls, N. Y., started a program to modernize its shipping department. This included a new palletizing installation and bulk-loading silos.

At this time—two years ago—the packing was carried on in three separate points at the plant. They were at inconvenient locations for good control of shipping, and a large labor force was required, especially at times of peak demand.

Realizing the immediate necessity of satisfying the demand for trucking, the management in the early spring of 1959 installed a temporary bulk-truck loading station to fill the requirements until a permanent installation could be erected. This station consisted of a simple hopper over a 50-ton truck scale. The hopper was fed by Airslides from conveyors in the existing packhouse. At that time provision was made at the same packing house to load trucks with bagged cement.

Meanwhile, studies were being



Left: A close-up of the interior of the palletizer, with the roller tables in the foreground.

Above: A forklift truck picking up a pallet loaded 8-high for direct loading.

made for a permanent installation. As a result, a decision was reached to erect a building for palletizing the bag shipments and to build a modern bulk-loading plant with concrete silos. This meant the eventual abandonment of two of the old packhouses. The one packhouse which was left was very good structurally, and with modifications and additions to the building and packing equipment, it could readily be used for palletizing. This packhouse, known as the "silo packhouse," is adjacent to six existing cement storage silos, and cement can be brought to it from other bins close to the mill.

The first step in this conversion was started in April, 1960. It consisted of the erection of an 80- by 160-ft. building. This area permits storage of palletized bags, so that they are ready for shipment at any time.

During the erection of this building changes were taking place in the "silo packhouse." One of these consisted of installing two 4-tube St. Regis packing machines to replace two 3-tube machines. The overhead hoppers feeding the new machines were also rebuilt, a new spill-screw conveyor system was installed, and modifications were made to the dust-collecting system. Fringe bins on the rebuilt hoppers were included. After the palletizing building was finished, new spring belt bag conveyors were installed at the bag machines. A palletizing machine was placed near the end of the new building nearest the packhouse.

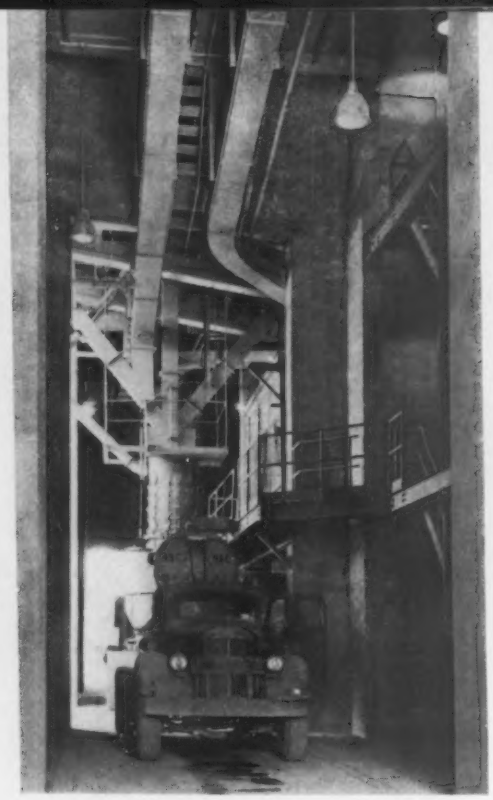
Between the packing machine conveyors and the palletizer is a conveying system consisting of Flexoveyor spring belt conveyors with a scale which automatically rejects any bags that are overweight or underweight. After leaving the scale the bags are elevated in a bag flattener, from which they are conveyed to the top of the Lamson Corp. palletizer.

The palletizer can be adjusted, of course, to loading different layers of bags on the pallets, up to nine bags high. Doors in this palletizing building are wide enough to accommodate flat-bed trucks for bag loading. By loading pallets ahead of time and using the ample floor space to store them, these trucks can be loaded at any time.

Two forklift trucks serve the palletizing machine and they are used to load the trucks, as well as the freight cars along one side of the building. With this flexible equipment orders can be processed very quickly. Three main types of cement are handled here: portland, high-early, and masonry. On the average, approximately 300 barrels can be palletized per hour. Clean bags are very desirable in this operation.

The palletizing system was put into operation in the middle of September, and at about that time the contract for the new bulk-loading silos was let.

From the results of exploratory drilling in the investigation of the character of the ground on which the silos are built, and considering the distance to bedrock, it was decided that steel piling should be used to support the structure. First, an excavation 10 ft. deep and large enough to take a 38- by 156-ft. concrete mat was dug; and the steel piling, consisting of 14-in. BP89 H-beams, was driven in this excavation to a point of resistance in the bedrock which was about 40 ft.



This truck is being loaded on a 50-ton scale at a central spout which can receive cement from any bin via air conveyors above.

Railroad cars are loaded on a 150-ton scale at a loading spout alongside the silos. The pivotted spout can reach both car hatches.

below the bottom of the excavation. There were 356 of these H-beams.

After the piling had been driven, the mat of concrete which supports the silos was poured into the excavation to a depth of 5 ft. This mat required nearly 800 cu. yd. of concrete; upon this mat a slip form about 4 ft. high was built.

The first concrete was poured in the slip form on December 5, 1960; and pouring 24 hours every day, the top, 170 ft. above the concrete mat, was reached on December 18. All through this pour very cold weather prevailed, and for a couple of days the temperature at times fell to minus 8 deg. F. This extreme cold slowed up the work and probably added a day or two to the time required to place the silo walls, in which there are approximately 6,800 cu. yd. of concrete.

There are four circular silos on a longitudinal centerline, with a space of about 20 ft. between the two inner silos, in which there are six smaller bins. The circular silos are 32-ft. in inside diameter and all of them have division walls, so that there are four completely separate bins in each silo. Each quarter bin in the silos holds 5,000 bbl., and each of the six inner bins holds about one-half as many barrels. The total normal capacity of all the bins in this system is 93,500 bbl.

Cement can be placed in these bins either directly from the finish mill by means of Fuller-Kinyon pumps and transport lines, or by transferring from some of the old bins near the plant by similar equipment. The addition of two new Fuller-Kinyon pumps and the relocation of one already on hand has made a very flexible and convenient system for getting cement to the right bins as desired. With so many types of cement to handle, it is a particularly convenient system. All transport lines are 8-in. in diameter.

As the cement is delivered to the silo bins, dust collectors on the tops of the silos act as alleviators to vent the bins. There are also dust collector lines down the sides of the walls to the point of delivery to the trucks or to the railroad cars, to keep all possible dust points clean. The concrete walls of the circular bins are all 108 ft. deep, and the wall of the in-between bins is several feet deeper. At the bottom of all of these bins are steel hopper bottoms with plenty of pitch for good delivery to the carriers below. These steel hopper bottoms are held in place by a concrete ring beam at the bottom of the concrete silo walls.

Cement from any of the bins can be delivered to either of two points for loading by means of Airslides and valves.

Trucks to be loaded are driven under the bins to a central loading spout which can receive cement from any bin. This loading spout, regulated by air, can be set on the truck hatch opening to make a dust-tight joint and then raised and lowered again to fill other truck hatches. As the truck is loaded, it is resting on a 50-ton scale and weighed as it is loaded.

Railroad cars are loaded on a 150-ton track scale on a track along one side of the silos. They, too, have a similar loading spout, except that it is hung so that it can travel in the arc of a partial circle, permitting it to spout into the hatches on both sides of the center of the car.

Delivery of cement from the finishing mill to the new silos is all regulated from a control room in the finishing department. Transferring of cement from bins outside

the new silos is controlled from a panel in a housing at the top of the silos.

Loading of cement into either railroad cars or trucks is supervised from a control room located under the silos and between the truck-loading station and the railroad car loading point. This control room has glass nearly all around and is high enough for the operator to see all loading operations at a glance. A 100-bbl. truck can be loaded in seven to eight minutes, and a 400-bbl. capacity railroad car can be loaded in 15 to 20 minutes.

New tracks and the extension of existing tracks permit the storage of a larger number of cars in the yard. A large parking lot has been made on the other side of the silos (opposite the track side) for the use of trucks awaiting filling or for directions for delivery.

For access to the top of the silos there is a freight elevator with capacity of 2,000 lb., and there is also a spiral stairway. The silos were designed by W. R. Bendy, cement engineers, and built by Plummer Associates, Inc.

The Flintkote Company makes a broad line of building products for home and industry. Its fabricated mined products—in which cement plays a substantial role—constituted 40 percent of the company's total sales of more than $250 million in 1960, leading all other product lines.

Besides its fabricated mined products, Flintkote makes a wide range of paper products; building products such as shingles, siding, ceiling and floor tile; industrial and asphalt paving products; and pipe and conduit for industrial and residential use.

In addition to the Glens Falls facility, Flintkote has cement plants at Kosmosdale, Ky.; Middle Branch, Ohio; San Andreas, Calif., and Redding, Calif., the latter to be completed this fall. It is also active in the ready mixed concrete field.

Better Breakage

(*Concluded from page* 107)

before. Biggest difference, however, is the use of extended firing delays to control vibration.

Thirty Delays Used

On May 10, 1961, a typical shot was made at the quarry. Using a rented "down-the-hole" rig (about $1.50/ft.), 88 vertical 3½-in. holes were drilled to a depth of 68 ft., including 3 ft. of sub-drilling. The working face was 65 ft. high and 400 ft. wide. Drilled in three rows on 10 x 12 burden and spacing, the round was designed to dislodge 63,800 tons of rock.

Careful planning was essential because the formation is complex. It pitches steeply and has prominent bedding planes with numerous sedimentary inclusions. The working face, therefore, is maintained at a right angle to the strike of the bedding planes. The rock is a very hard metamorphic variety called Kittery trap rock and has tested out at 7 percent on the Los Angeles wear tests. Drilling and loading plans were prepared by Mr. Fuller, with Atlas technical assistance.

A total of 18,500 lb. of explosives were used consisting of 75 percent Giant gelatin, 60 percent Giant gelatin, Gelodyn No. 1 dynamite, and Gianite WR water-resistant ammonium nitrate. Powder factor was 3.5 tons of rock per lb. of explosive. Each hole was loaded with about 46.5 lb. of 75 percent gelatin, 46 lb. of 60 percent gelatin, 84 lb. of Gelodyn No. 1, and 27 lb. of ammonium nitrate. The more powerful dynamites were loaded first, and the hole was topped off with ammonium nitrate. Holes were stemmed for about 8 ft.

The shot was fired with 88 Rockmaster millisecond-delay electric blasting caps hooked up to a Shotmaster condenser discharge blasting machine. Thirty millisecond-delay periods were connected in parallel series across the face, starting with "O" or instantaneous in the first hole of the front row and continuing across the face in numerical sequence.

This firing sequence opens up one end of the face first and then proceeds at a 45 degree angle across to the other end. No more than three caps per delay are fired at one time, which controls the amount of vibration. This averages out to about 610 lb. of explosives per delay. Because the charges are initiated at the bottom, excellent confinement is attained, which improves fragmentation. Total elapsed time of the 30-delay firing sequence is 2,250 milliseconds (2¼ seconds).

This shot dislodged an estimated 25,520 cu. yd. of trap rock in the solid—about 65,800 tons. In terms of actual production of broken stone, the shot accounted for an estimated 35,728 cu. yd., or 89,320 tons of stone. This is equivalent to a 4-month supply for the plant, which has a capacity of 200 t.p.h. The muck pile is transported to the feeder hopper by two Euclid rear-dumps which are loaded by three Northwest Model 6 shovels with 1½-cu. yd. buckets. A Hough H-90 loader is used for clean-up and auxiliary loading.

Major Equipment Reference

30-in., primary red. crusher (1) ..... Allis-Chalmers
Gyratory crushers (5) ..... Allis-Chalmers
Screens (10) ..... Allis-Chalmers
Hot top plants (2) ..... Cedarapids
Trucks (42) ..... All makes
Explosives ..... Atlas Powder Co.
Shovels—1½ yd. (3) ..... Northwest
Loader (1) ..... Hough H-90

Riverside Cement Company will begin construction in November on a new gray cement raw department at Crestmore, Calif. The plant, to be built by Macdonald Engineering Company of California, will have four kiln feed silos, three raw material silos, a sample building, a mill feed bin, and four conveyor support piers.

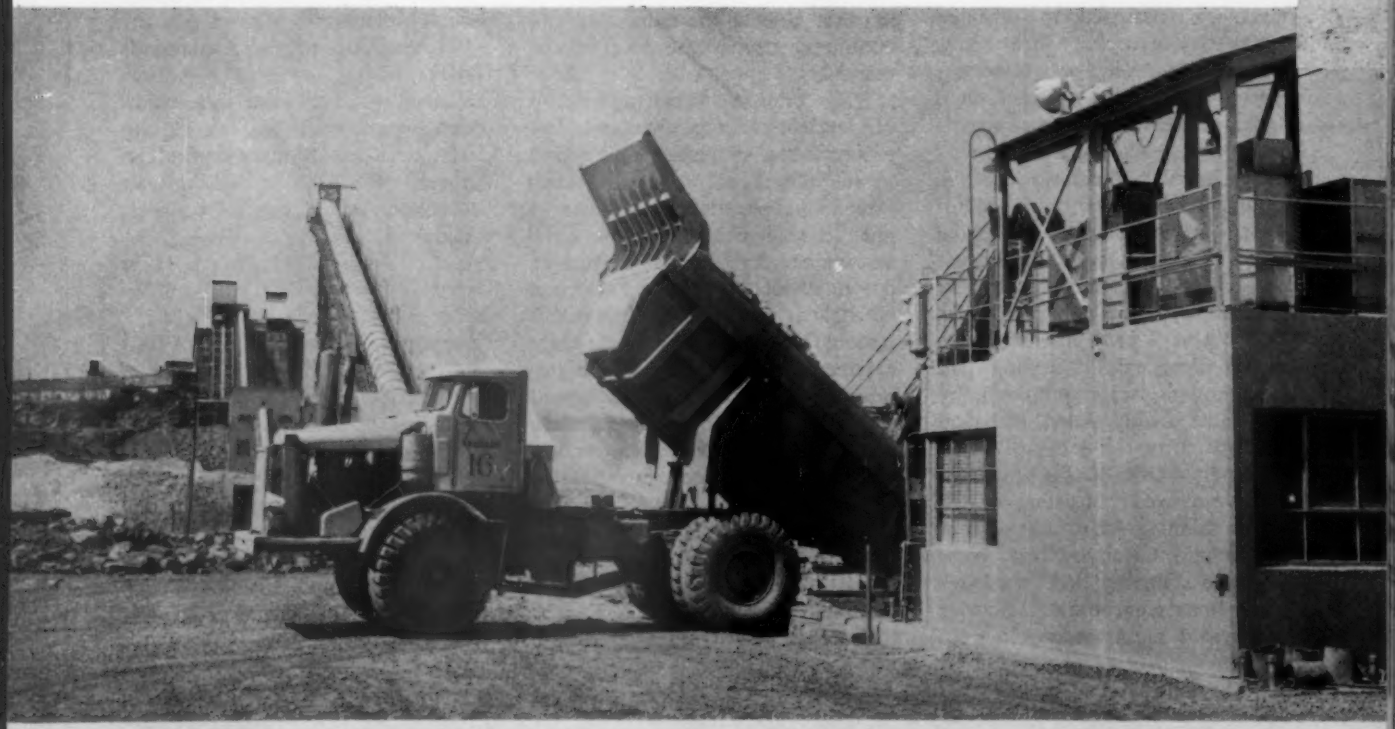
"Our R-27 'Eucs' give us good availability... keep maintenance costs low."

Augie Matuzak,
Quarry Supt.
Huron Portland Cement Co.
Alpena, Michigan

Seven Euclid Rear-Dumps of 27-ton payload capacity maintain steady production at the big Alpena quarry of Huron Portland Cement Co. Each "Euc" dumps approximately 196 tons of stone into the crusher every hour . . . round trip haul from face to crusher and return averages 2400 feet. The previous owner of this quarry had used a fleet of smaller Euclid Rear-Dumps for twelve years.

Each of the Model R-27 haulers has over 6,000 operating hours. Engines and transmissions have given excellent service without rebuilding or major trouble . . . tires were recently recapped for the first time.

Like hundreds of other mine and quarry operations throughout the world, Huron Portland Cement has found that Euclid equipment is a fine investment. Rugged dependability, excellent accessibility for servicing, and the industry's most experienced and qualified dealer organization add up to bonus benefits that aren't apparent in rear-dump specification data. Your dealer will be glad to provide detailed information on the tractors, scrapers, rear-dump and bottom-dump haulers that fit your needs.



Loaded by two 6 cu. yd. shovels, the 27-ton "Euc" Rear-Dumps haul from the loading shovel to the hopper in the quarry floor. Purchased in 1959, these 7 Euclids replaced a fleet of smaller "Eucs" that had worked in this quarry for twelve years.

Loads of 27 tons and more are hauled across the quarry floor and dumped into the hopper at the primary crusher. Six Euclids work an 8-hour shift 5 days per week—one is kept as a stand-by unit. In a recent five month period the "Eucs" moved 41,703 loads—a total of 1,221,201 tons.

A TC-12 Twin Crawler is used to stock out and reclaim stone from the quarry stockpile. After well over 5,000 hours of work in this quarry the original under-carriage is almost "good as new".

GM GENERAL MOTORS EUCLID

EUCLID

DIVISION OF GENERAL MOTORS, HUDSON, OHIO

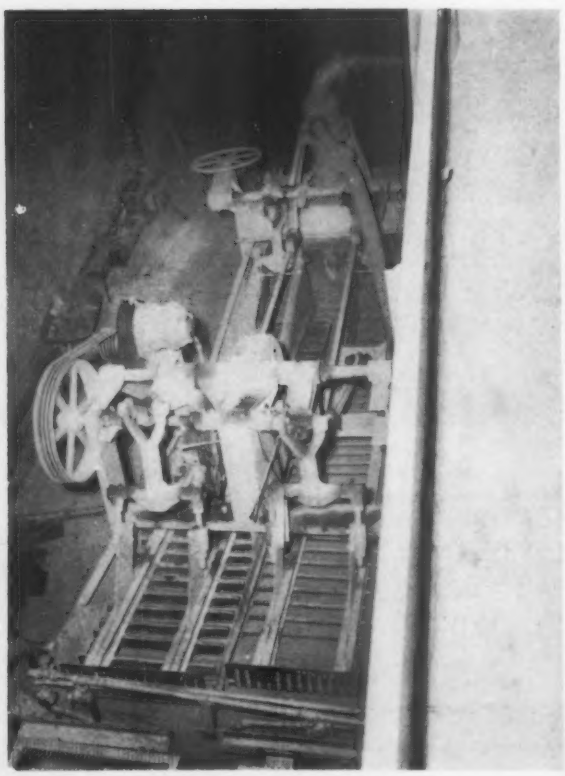
Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

Enter 112 on card, page 149

Over-all view of the MiClaSil plant at Bovill, Idaho. The thickener tanks are outside the buildings. The smaller structure at the left is the maintenance building; the larger building houses processing equipment.

New Idaho Silica Sand-Clay-Mica Plant added to Simplot's Widespread Industrial Empire

By HARRY F. UTLEY

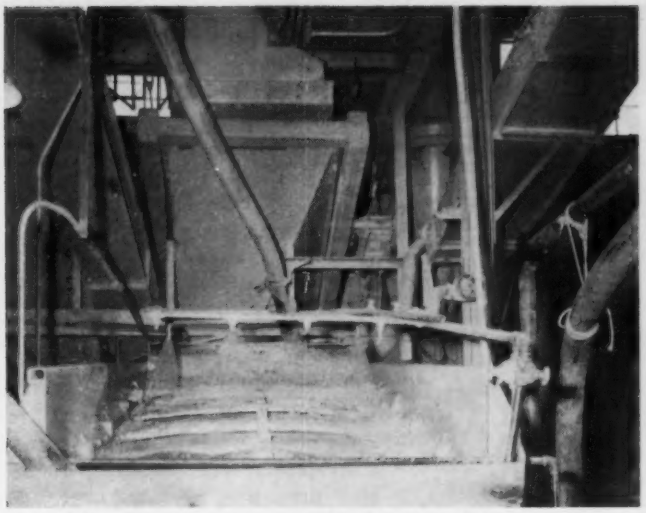


This duplex rake-classifier is fed from the underflow of the 12-in. wet cyclone seen in the upper part of this picture.

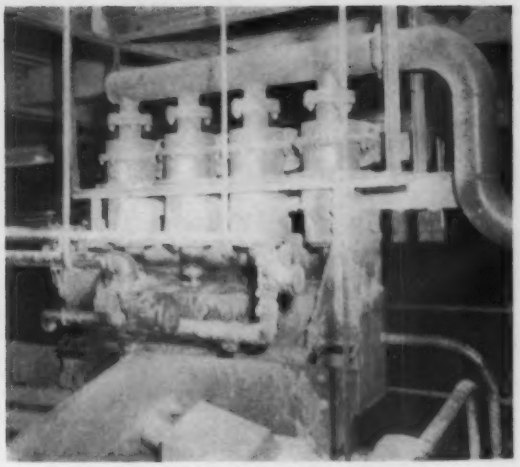
ANOTHER ON THE SPOT report

THE FIRM name of J. R. Simplot Company, in the short space of 20 years, has come to be one to be reckoned with in the West. J. R. (Jack) Simplot, in his younger days a produce commission merchant in Idaho, launched his far-flung industrial empire in 1940 with the erection of a food-processing plant. Today, the firm, with headquarters in Boise, embraces many fields—lumbering, potato growing and processing, livestock raising, and mining—to mention a few.

While Simplot's Minerals and Chemical Division is engaged in the mining of iron ore in Nevada and Alaska, the company's activities in the mining, quarrying, and processing of various nonmetallic minerals are the facets of interest which crop up most frequently in the pages of PIT AND QUARRY. Phosphate mining and phosphatic-fertilizer production have been the chief objects



Primary separation of the sand is achieved over this spray-equipped screen. Plus 28-mesh rejects are stockpiled as blast sand.



Four 6-in. wet cyclones feed sand as underflow to a 12-in. cyclone ahead of the duplex classifier. Overflow is carried by an overhead pipe to the clay processing side.

of attention in this field, although barite mining in the Sawtooth Mountains of Idaho, fluorspar operations near Challis, Idaho, and dredging for rare-earth elements in Long Valley, Idaho, have diversified Simplot's industrial-minerals enterprises.

Then, a few years ago, the company got into the silica-sand business in a rather big way when it acquired high-grade deposits and the plant of the Nunn interests at Overton, Nev., and proceeded to upgrade production methods in typical Simplot fashion.

Now the firm has gone into the industrial- and glass-sand business on an even greater scale with the establishment of its "Miclasil" operations at Bovill, Idaho.

While output from the new $1,500,000 20-t.p.h. plant has been pretty much confined to silica-sand initially, production of high-quality white clays will be well under way late in 1961; and a third product, scrap (small particle) mica, will be extracted and processed a little later on. Thus the coined name of the new plant—MI, for mica; CLA, for clay; SIL, for silica sand—Miclasil.

The company has leases on about 8,000 acres of deposits in the Bovill region in northern Idaho. The sand and clay occur in contiguous layers, or beds, beneath overburden ranging from 6 to 60 ft. in thickness. Pits have been opened after stripping with Euclid scrapers and push-loading with Caterpillar tractors, to expose the fine, white, transported clay and the unconsolidated sands.

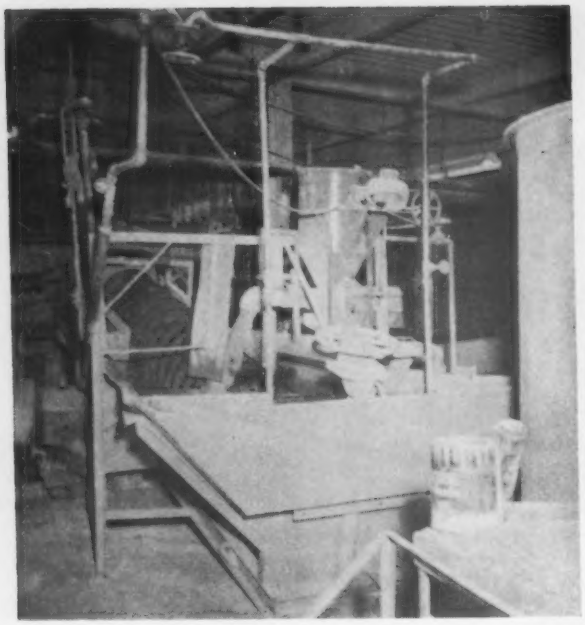
Sand, as well as clay, is delivered to the new plant hydraulically. A slurry varying from 35 to 50 percent solids is pumped from pit to plant. The distance is in the range of 1,800 to 2,000 ft., and the pipeline is 4 to 5 in. in diameter. Viscosity of the slurry is regulated at the pit sumps by the introduction of dispersing agents. The large quantity of water required comes from a 100,000,000-gal. reservoir formed by damming up Moose Creek a short distance away. Current water requirements are about 1,150 g.p.m. Of this total, 550 g.p.m. is fresh water and 600 g.p.m. make-up, reclaimed from settling ponds.

The main plant building is a concrete masonry structure 100 by 122 ft. in ground area and rising 30 ft. to the eaves. A little more than one-half of the building houses equipment to process the sand; the remainder is the clay side.

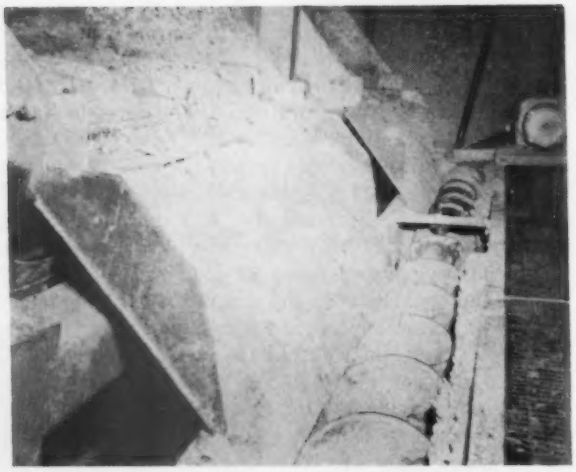
As the slurried pit-run material reaches the plant, the first pass is over a Kolman single-deck vibrating screen. The sand retained on the 28-mesh cloth is taken out of the circuit and stockpiled as blast sand. Minus 28-mesh screen throughs are then pumped to a series of four 6-in. Dorrclones. Overflow from these wet cyclones goes to the clay-processing side, while underflow, cut at about 30 microns, passes to a 12-in. Dorrclone. From the larger cyclone, underflow is deslimed and partially dewatered in a Dorr duplex rake-classifier, to yield a 72 percent solids sand. Minus 100-mesh overflow from the classifier, as well as overflow from the 12-in. Dorrclone, can go to the clay department or to waste, at option.

Beneficiation of the sand at this stage to yield high-grade glass and construction sands then begins in earnest as the product of the rake-classifier is subjected to thorough scouring of the grains in a battery of company-designed high-density attrition scrubbers. The scrubbed sand is then dewatered in a Wemco screw classifier. The sand elevated by the spiral passes to a 4- by 10-ft. Ty-Rock step-deck screen for a split at 48-mesh. The tub overflow is pumped back to the Dorr classifier.

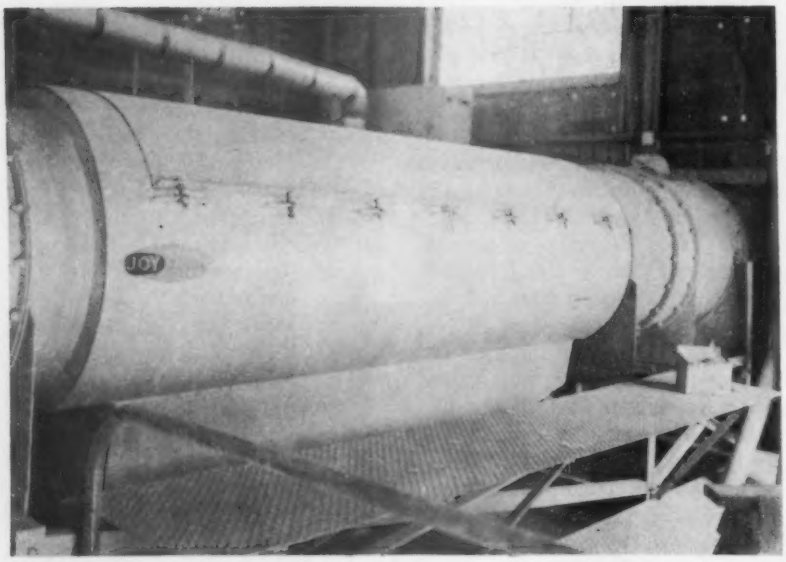
Sand retained on the screen (28 by 48 mesh) goes to one of two company-designed 7-deck, direct-gas-fired dryers. Screen throughs (48 by 100 mesh) drop to a pair of 4- by 10-ft. Ty-Rock screens fitted with 100-mesh cloth. This pair of screens acts primarily as a final dewatering setup since there is very little 100-mesh remaining at this point. The 48 by 100 sand then



The screw classifier which dewaters the product of the high-density attrition scrubbers.



Screw conveyors remove sand retained by a pair of 48-mesh single-deck screens preparatory to drying.



The pair of microdyne scrubbers which serve to collect dust from the two dryers.

enters the second dryer.

Some of the dried coarse sand is shunted out of the plant flow after leaving the one dryer. Because it contains sparkling mica particles, it is in good demand among concrete products makers in the Northwest for its decorative appearance as fine aggregate in split block.

Further refining of the sand for glass making, foundry use, etc., is accomplished in two final stages: (1) a series of Carpco separators (4 stacks of 3 separatory units) where the mica flakes, rutile, and ilmenite particles (but principally mica) are pulled out electrostatically; (2) a bank of Stearns magnetic separators that remove iron-bearing particles and other magnetics.

Following magnetic separation, the sand is of high quality, and low enough in Fe_2O_3 (about .025 percent) and Al_2O_3 to meet rigid glass-sand specifications and for use in foundry core-rooms. Foundry managements, particularly, have been enthusiastic about the product due to inherent characteristics which give it exceptional "release-ability" in casting cores.

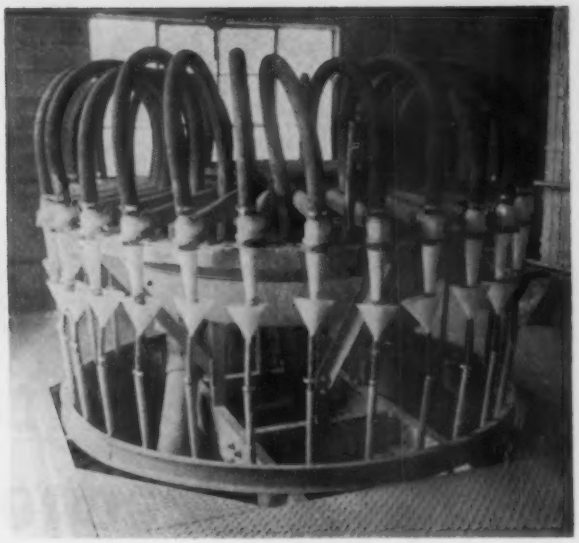
Should the final product not quite measure up to proper specifications, however, a bank of Wemco Fagergren flotation cells is available for further clean-up; normally, though, the flotation circuit is bypassed.

Two Joy Microdyne scrubbers have been installed horizontally in the exhaust duct work from the two dryers to collect dust.

Finished sands are stored in four 150-ton corrugated iron silos adjoining the mill building. Most of the output, probably 98 percent, is shipped in bulk in covered-hopper rail cars. The packaged portion of the output is sacked by a St. Regis valve bagger.

The plant is served by both the Milwaukee Road and the Washington, Idaho & Montana Railroad, the latter connecting with the Great Northern and Northern Pacific. The company erected its own 8,000-ft. spur track from the nearby town of

Four 150-ton corrugated-steel silos store the finished sands preparatory to shipment.



A battery of small wet-cyclone classifiers in the clay beneficiation circuit.

Bovill. A 23,000-volt high-line and a 32-mile pipeline to supply natural gas were brought in by public utility firms.

The first process step in the beneficiation of the clay will be by way of a 185-ft. diameter by 17-ft. deep Type S Dorr thickener with underflow control, plus a smaller 100-ft. by 12-ft. thickener of the same type. These are located just outside the plant building. They yield the primary-classified clay for processing within the plant structure. Much of the clay-working equipment was supplied by Dorr-Oliver, including two 11½- by 16-ft. filters with filtrate receivers, slurry mixers, several ODS pumps, and 25 small Type P Dorrclones. The latter are set up concentrically for common underflow recovery.

The region is noted for its clay resources, but that occurring in the Simplot leasehold differs from the common (Latah County) clays. It is a pure white, finely-divided kaolin-type mineral, and the end products of the mill will be fine, micron-sized clays especially suited to paper manufacture, both as a filler in the wood pulp and as coating material. Research also indicates probable marketability as a refractory clay since it is high in alumina.

The geology of the deposit is most interesting. It is probably unduplicated anywhere, in the opinion of Phillip T. Peterson, Bovill plant manager. Nature did an excellent job of sorting the materials and separating the sands from the clay. Over millions of years, the feldspars in the granite were altered to clay, and the quartz components to sand. The low mountain ranges formed natural settling basins and, with water requirements apparently exactly right, gentle erosion took place. This water action washed out the clay minerals first, and they were deposited to form the existing beds of white clay. Afterward thick layers of pure silica sand were deposited on the clay.

Research was carried on by Simplot's metallurgists for three years before the Miclasil plant was built. Core-drilling and close-order drill samples were analyzed initially at Moscow, Idaho, nearby, and later at the plant site. (The laboratory was the first structure to be erected.)

Although the Miclasil plant is in active production, it is by no means complete. There is, and probably will be for years, a continuing development, reflecting the spirit of the J. R. Simplot Co., which likewise continues to develop and grow.

This company is a composite of many vital elements. It is machines that dig potatoes, pick corn, and tear ores from the crust of the earth; it is industrial plants which convert raw foods, minerals, livestock into finished products on a 'round-the-clock schedule; it is sawmills, farm lands, herds of cattle, and sheep.

It is also people—people like Phill Peterson, a devoted Simplot veteran who supervised the building of the Bovill operation and continues as manager; Bob Lothrop, plant superintendent; Bill Winkle, director of Miclasil sales; Lew Prater, chief metallurgist; and Al Parisot, office manager.

Fredericksburg Sand and Gravel Co., Inc., near Fredericksburg, Va., formerly the Culpeper Sand Co., has begun operations at the 90-acre Kings Highway gravel pit leased from P. C. Goodloe & Son. E. S. Hawkins is president; and Wilfred L. Harris is manager, secretary-treasurer, and registered agent.

"Our 48 Ford Trucks have given maximum economy in every way!"

says Fred Newkirk, Manager of Materials Transportation Company, Inc., Corpus Christi, Texas

"We are using Ford Trucks exclusively because they provide important savings—starting with a lower initial expenditure. We estimate that each Ford costs us about $1,500 less than other makes of comparable size and capacity. Our maintenance and repair costs are less, too. The greater parts interchangeability on Ford Trucks makes it possible to reduce our parts inventory by about 50%; this frees $2,500 of working capital. And in operating expenses, we save on gasoline because our Fords deliver an extra ½ mile per gallon.

"They have proven more durable, too. For example, our 1958 Ford F-1000 has logged over 160,000 miles without even having the heads or pan off. We expect 200,000 miles from these Super Duties before a major overhaul. Some of our 1955 and 1956 Ford F-900's still have their original brake linings after 300,000 miles.

"Our trucks operate six days a week, and the average fleet mileage is 51,000 miles per week. We haul 48,000-lb. payloads of bulk cement or 37,760-lb. payloads of sack cement for Halliburton Portland Cement Company. Our drivers are also very enthusiastic about these new Ford Super Duties. They report that with 72,000-lb. grosses Fords are smooth riding and easy to handle."

Solid testimony that Ford's full-time economy only starts with low price!

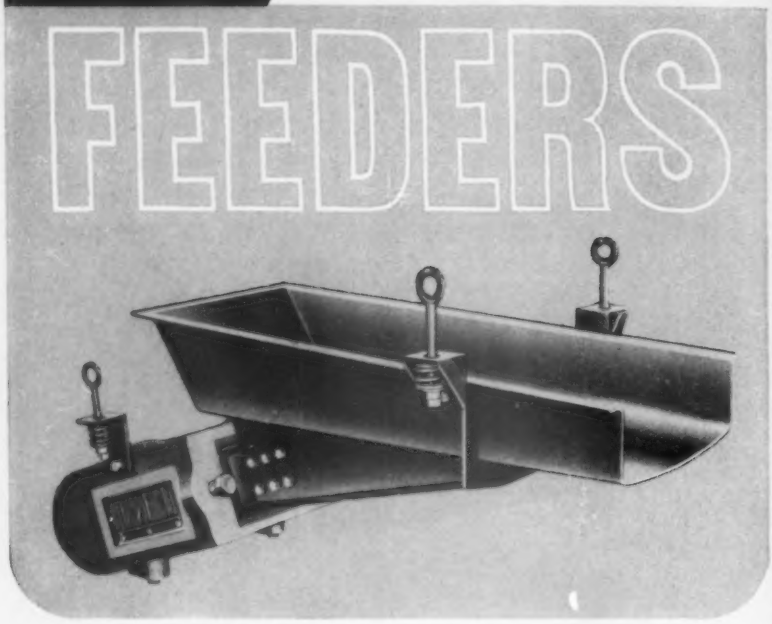
FORD TRUCKS COST LESS

PRODUCTS OF Ford MOTOR COMPANY

Enter 118 on card, page 149

REDUCE BULK MATERIALS HANDLING COST

SYNTRON VIBRATORY FEEDERS



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Syntron Heavy-Duty Vibratory Feeders have rated outputs of from 25 to 1000 tons per hour. They are designed to handle a great diversity of materials in a wide range of particle sizes—fine powder to large lumps, damp or dry, hot or cold.

Syntron Vibratory Feeders are plant proven for efficient, accurate, high capacity feeding, spreading, cooling, heating, and drying of bulk materials.

The Syntron electromagnetic drive has few mechanical moving parts, insuring dependability and low maintenance. Magnet and springs are dust tight for longer trouble-free service. Instant control of amplitude permits quick, accurate adjustment of material flow.

Available for floor or suspension mounting with flat pan or tubular trough in sizes to meet every feeding requirement.

Feeding minus 5 inch stone from the primary crusher onto a belt conveyor.

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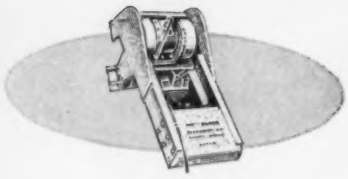
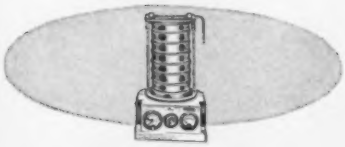
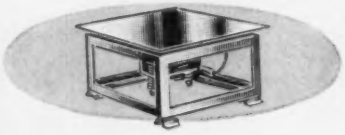


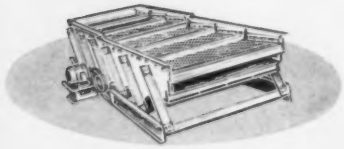
Car Shakers



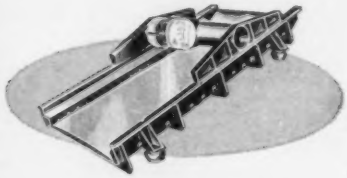
Test Sieve Shakers



Packer & Jolters



Mechanical Vibrating Conveyor Screens



Vibrating Screens

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Awards Announced for Winners Of 1960 N.S.A. Safety Contest

IN the 12th annual safety competition, sponsored by the National Slag Association and conducted by the U. S. Bureau of Mines, top safety honors for 1960 went to the Lackawanna No. 2 plant of The Buffalo Slag Company, Inc., at Lackawanna, N. Y., and the Middletown plant of American Materials Corporation at Middletown, Ohio.

Bronze plaques, provided by PIT AND QUARRY magazine, were given these plants for attaining the best safety records in the two groups of slag plants into which the competition is divided. The Bureau of Mines also presented a Certificate of Achievement in Safety to the winning plants for operating during 1960 without a disabling work injury. In addition, the Bureau presented a Certificate of Accomplishment in Safety to each employee and official of the winning operations.

Class A—Plants operated 60,000 man-hours or more—For the first time in 12 years of participation, the Lackawanna No. 2 plant was awarded a bronze plaque for the best safety record in the Class A, or large-plant group. It operated without a disabling work injury while accumulating a total of 133,995 man-hours. During the 12 years of participation, this plant amassed 1,847,984 man-hours and its overall record was 22.186 injuries per million man-hours and 7,150.495 days lost per million man-hours of exposure to the hazards of processing iron blast-furnace slag.

Thirteen other plants in this class of the competition also had injury-free operations during 1960.

Class B—Plants operated less than 60,000 man-hours—The Middletown plant, with the best safety record in the small-plant group, received the PIT AND QUARRY plaque in its first year of participation in the National Slag Association Safety Competition. In 1960, employees of this slag operation worked 51,605 man-hours free of disabling work injuries.

In the small-plant group, 14 slag-processing installations operated during 1960 without a disabling work injury. The Middletown plant, however, won because it worked the greatest number of man-hours.

Injury-free operations—Director Marling J. Ankeny of the Bureau has said, "A noteworthy achievement in the 1960 National Slag Association Safety Competition was the record number of plants that operated without a disabling work injury—33, or 67 percent of all participants." Those with perfect safety records amassed 1,948,834 man-hours—equivalent to more than 60 percent of the man-hours accumulated by all contestants.

Twenty-nine of the thirty-three injury-free operations worked 20,000 or more man-hours without a disabling work injury and won Certificates of Achievement in Safety. The employees and officials of these plants received Certificates of Accomplishment in Safety. These awards were made by the Bureau of Mines. Four other plants with injury-free records did not qualify for certificate-awards because they operated fewer than the required 20,000 man-hours.

The following (excluding the plaque-winners) were recipients of Certificates of Achievement in Safety:

Corrigan-McKinney plant, The Standard Slag Co., Cleveland Ohio, 124,279 man-hours
Weirton plant, The Standard Slag Co., Weirton, W. Va., 117,841 man-hours
Woodlawn Plant No. 1, The Buffalo Slag Co., Inc., Woodlawn, N. Y., 114,509 man-hours
Foamed Slag plant, Bethlehem Steel Co., Sparrows Point, Md., 112,996 man-hours
Mingo Junction plant, The Standard Slag Co., Mingo Junction, Ohio, 104,571 man-hours
Bethlehem Slag plant, Bethlehem Steel Co., Bethlehem, Pa., 86,743 man-hours
Dock 8 plant, The Standard Slag Co., Cleveland, Ohio, 86,048 man-hours
Johnstown plant, Cambria Slag Co., Johnstown, Pa., 84,870 man-hours
Republic plant, The Standard Slag Co., Youngstown, Ohio, 75,880 man-hours
South Deering plant, Illinois Slag and Ballast Co., Chicago, Ill., 68,021 man-hours
Gary plant #2, Consumers Co. Div of Vulcan Materials Co., Gary, Ind., 67,683 man-hours
Birmingham Slag plant, U. S. Pipe and Foundry Co., Birmingham, Ala., 60,667 man-hours
Harriet Plant #3, The Buffalo Slag Co., Inc., Tonawanda, N. Y., 60,111 man-hours
Ashland plant, The Standard Slag Co., Ashland, Ky., 50,017 man-hours
Hamilton Slag plant, American Materials Corp., Hamilton, Ohio, 49,148 man-hours
Sharpsville plant, Cambria Slag Co., Sharpsville, Pa., 46,379 man-hours
Midland Plant, The Midland Slag Co., Midland, Pa., 44,784 man-hours
Donora plant, Cambria Slag Co., Donora, Pa., 43,702 man-hours
Portsmouth plant, The Standard Slag Co., New Boston, Ohio, 43,241 man-hours
Woodward plant, Birmingham Slag Div. of Vulcan Materials Co., Woodward, Ala., 43,000 man-hours
Aliquippa plant, Duquesne Slag Products Co., West Aliquippa, Pa., 38,181 man-hours
Ecorse Open Hearth Plant No. 3, Edward C. Levy Co., Ecorse, Mich., 34,645 man-hours
Monessen plant, Duquesne Slag Products Co., Belle Vernon, Pa., 31,656 man-hours
Detroit Hard Slag Plant No. 1, Edward C. Levy Co., Detroit, Mich., 31,106 man-hours
Lordstown plant, The Standard Slag Co., Lordstown, Ohio, 29,790 man-hours
Erie Plant No. 5, The Buffalo Slag Co., Inc., Erie, Pa., 29,243 man-hours
Toledo plant, The France Stone Co., Toledo, Ohio, 27,970 man-hours

Injury experience—The injury experience of the 49 competing plants in the 1960 National Slag Association Safety Competition was the best in the 12-year history. The injury-frequency rate of 8.042 per million man-hours worked was 35 percent below that of 12.433 for 1959 and 48 percent below the 12-year-average rate of 15.426.

The average severity rate among slag participants was 451.288 days charged per million man-hours worked, 85 percent below that of 3,060.684 in 1959, and 89 percent below the 12-year-average rate of 4,257.536. These 49 operations

(*Concluded on page* 131)

Winning Sand-Gravel Plants Cited In 1960 Mines Bureau Safety Contest

MORE than half the plants in the 1960 National Sand and Gravel Safety competition operated the entire year without a disabling work injury, according to the U. S. Bureau of Mines, sponsor of the event. Of 188 plants that enrolled in the contest, 107 were reported injury-free.

Plants competed in two groups: (1) bank or pit, with 154 participating, and (2) dredge, with 34 participating. The injury-free operation working the highest number of man-hours in each group was the winner, and its employees and officials received individual Certificates of Accomplishment in Safety. Certificates of Achievement in Safety were awarded to each of the two winning plants and to 58 other injury-free plants which operated at least 20,000 man-hours during the year.

The total of man-hours worked by all 188 participating operations in 1960 was 8.7 million. Collectively, these had an over-all injury-frequency rate of 23.6 disabling work injuries per million man-hours of exposure to hazards and an injury-severity rate of 4,632.6 man-days charged per million man-hours.

Bank Or Pit Plants

The Fred plant of Southwest Construction Materials Co. at Grand Prairie, Tex., won top honors for 1960 in the bank or pit group, with 163,428 man-hours without a disabling work injury. During the 11 years the Fred plant has entered the competition, it has recorded 50 disabling work injuries, resulting in 1,591 man-days of disability. Its 11-year injury-frequency rate was 21,825 per million man-hours and the severity rate, 694.5—each well below the corresponding rate for 1960 and for the history of the competition. The Fred plant ranked second in the 1959 competition.

The 154 bank or pit plants in the 1960 competition were operated more than 6 million man-hours. Their combined injury-frequency rate was 24.687 per million man-hours, 21 percent higher than the corresponding rate of 20.442 in 1959 and 7 percent above the 11-year average rate for the competition. The injury-severity rate for this group in 1960 was 5,950.9, compared with the previous year's rate of 1,314.8; and it was more than twice the accumulated rate for the 11 years the competition has been held. This was due to substantial increases in the number of fatal and permanent-partial injuries. In 1959 only 1 fatality and 1 permanent-partial disability were recorded, but in 1960, 4 fatalities, 6 permanent-partial, and 152 temporary-total disabilities occurred at competing bank or pit plants. These injuries and deaths caused 39,051 man-days of lost time, a total four times greater than in 1959.

Dredge Plants

The Kinder plant of Gifford-Hill & Co., Inc. at Kinder, Allen Parish, La., had the best safety record among dredge operations—140,250 man-hours of operation without a disabling work injury. This plant has been a contestant every year since 1953 and won first place once before, in 1958. During its eight years of participation the Kinder plant has been operated 1,024,186 man-hours, with 15 disabling injuries causing 13,978 days of lost-time. The plant has an over-all injury-frequency rate of 14.646 injuries per million man-hours and an injury-severity rate of 13,647.9 man-days per million man-hours.

The 34 dredge operations in the competition worked a total of 2,113,627 man-hours, with 43 disabling work injuries, causing 1,141 man-days of disability. The injury-frequency rate for this group was 20.344 injuries per million man-hours—down 14 percent from the 1959 rate of 23.695 and 2 percent below the 11-year average rate of 20.702. The dredge group's injury-severity rate of 539.8 man-days per million man-hours of exposure was the second-lowest rate ever achieved by this group in competition. The lowest was 314.2, for 1958. This 1960 severity rate was approximately one-sixth the average rate of 3,495.4 for the 11-year period.

Safety Records

In the 1960 competition 107 participating plants—85 bank or pits and 22 dredges—operated through the year without a disabling work injury. Employees at these plants worked 3,642,442 man-hours or 42 percent of the accumulated worktime of all contestants. However, 44 of these operations—38 banks or pits and 6 dredges—worked less than the 20,000 man-hours required in order to be eligible for an award. Three injury-free operations that did work 20,000 or more man-hours were ruled ineligible for failure to comply with competition regulations.

Statistics

The safety record attained by all contestants during 1960 was less favorable than those of previous years. A total of 8,675,838 man-hours was worked, with 205 disabling work injuries, resulting in an injury-frequency rate of 23.629 and an injury-severity rate of 4,632.6 per million man-hours of exposure. The frequency rate was the fourth-highest and the severity rate was the highest in competition history. Both rates were higher than the corresponding rates for 1959 and the 11-year averages.

Injuries for which causes were reported were classified as follows: handling objects, falls of persons, machinery, haulage, falling objects, bumping objects, flying objects, and hot substances. The first six of these causes accounted for 153 injuries or 75 percent of all injuries reported. The most severe injuries were

charged to machinery, haulage, falls of persons, handling objects, flying objects, and hot substances, in that order. These injuries caused 39,206 days of disability or 97.7 percent of all man-days lost or charged to injuries.

At bank or pit operations, injuries from handling objects, falls of persons, machinery, haulage, falling objects, and bumping objects accounted for 18.8, 16.9, 12.5, 11.9, 8.1, and 6.9 percent, respectively, of all injuries for which causes were given; 75 percent of all injuries were shown under these causes. The most severe injuries at bank or pit operations were caused by machinery, haulage, falls of persons, and handling objects, in that order, and resulted in 37,645 man-days of disability.

In the dredge group the principal causes of disabling injuries included handling objects, falls of persons, machinery, bumping objects, and falling objects, in that order. However, the most severe injuries were ascribed to accidents involving machinery, handling objects, falling objects, and slides of material.

Winning Plants

The plants that worked 20,000 or more man-hours without a disabling work injury (excluding the two winners) and that qualified by meeting all requirements of the competition rules, were awarded Certificates of Achievement in Safety. The names, locations, and man-hours worked are as follows:

Hoot Plant, Texarkana, Ark., Gifford-Hill & Co., Inc., 162,028

Wilson Plant, Turkey Creek, La., Gifford-Hill & Co., Inc., 138,592

Lafayette Plant, Lafayette, Ind., Western Indiana Gravel Co., 101,920

Burt Plant, Waco, Tex., Gifford-Hill & Co., Inc., 97,296

Irwindale Plant, Irwindale, Calif., Consolidated Rock Products Co., 90,148

Bluff Creek Plant, Bluff Creek, La., Jahncke Service, Inc., 89,562

Swannanoa Plant, Swannanoa, N. C., Grove Stone & Sand Branch of B. V. Hedrick Gravel & Sand Co., 88,384

Albuquerque Plant, Albuquerque, N. Mex., Albuquerque Gravel Products Co., 81,565

Sun Valley Plant, Sun Valley, Calif., Consolidated Rock Products Co., 77,457

Symmes Plant, Hamilton, Ohio, American Materials Corp. (American Aggregates Corp.), 75,266

Dept. No. 498 Plant, Crystal Lake, Ill., Consumers Co. Div. of Vulcan Materials Co., 74,665

Morris Plant, Morris, Ill., Material Service, Div. of General Dynamics Corp., 70,167

North Dayton Plant, Dayton, Ohio, American Aggregates Corp., 64,936

Mitch Plant, Texarkana, Tex., Gifford-Hill & Co., Inc., 63,186

Hudson Plant, Hearne, Tex., Gifford-Hill & Co, Inc., 61,980

Cooks Station Plant, Montgomery, Ala., Birmingham Slag Div. of Vulcan Materials Co., 51,500

Kaw No. 2 Plant, Turner, Kans., Stewart Sand & Material Co., 51,060

Orange Plant, Orange, Calif., Consolidated Rock Products Co., 44,506

Santa Fe Plant, Irwindale, Calif., Blue Diamond Co., a Div. of The Flintkote Co., 44,419

Fort Jefferson Plant, Fort Jefferson, Ohio, American Aggregates Corp., 43,397

Massillon Plant, Massillon, Ohio, The Standard Slag Co., 43,359

Caledonia Plant, Readfield, Wis, C. H. Peters Co., 42,696

Kenvil Plant, Kenvil, N. J., Houdaille Const. Materials, Inc, 42,410

Missouri River Plant, Kansas City, Mo., Stewart Sand & Material Co., 41,639

Eddyville Plant, Eddyville, Iowa, Concrete Materials & Construction Div., American-Marietta Co., 41,597

Pete Plant, Lone Star, Tex., Grand Prairie Construction Co., 40,780

Saticoy Plant, Saticoy, Calif., Consolidated Rock Products Co., 38,652

South Bend Plant, South Bend, Ind., Western Indiana Gravel Co., 38,155

South Dayton Plant, Dayton, Ohio, American Aggregates Corp, 38,080

Lincoln Plant, Lincoln, Ill., The Lincoln Sand & Gravel Co., 38,027

Hartland Plant, Hartland, Wis., Hartland Sand & Gravel Co., 38,015

Everett Plant, Everett, Wash., Associated Sand & Gravel Co., 36,984

Claremont Plant, Claremont, Calif., Consolidated Rock Products Co., 36,563

Dept. No. 481 Plant, Algonquin, Ill., Consumers Co. Div. of Vulcan Materials Co., 34,540

Cayuga Plant, Cayuga, Ind, Material Service, Div. of General Dynamics Corp., 34,049

Boonville Plant No. 1, Boonville, N. Y., Eastern Rock Products Co., 33,146

Barneveld Sand Plant No. 2, Barneveld, N. Y., Eastern Rock Products Co., 32,851

Correctionville Plant, Correctionville, Iowa, Concrete Materials & Construction Div., American-Marietta Co., 32,296

Moses Lake Plant, Moses Lake, Wash., Columbia Sand & Gravel, Inc., 32,078

Riverdale Plant, Riverdale, N. J., Houdaille Construction Materials Inc., 30,844

Franklinville Plant "F," Franklinville, N. Y., The Buffalo Slag Co., Inc., 29,266

Cedar Rapids Plant, Cedar Rapids, Iowa, Concrete Materials & Construction Div., American-Marietta Co., 27,643

Channahon Plant, Channahon, Ill., Material Service, Div. of General Dynamics Corp., 26,893

Trinity Plant, Chatfield, Tex., Trinity Sand & Gravel Co., 26,572

Franklin Plant, Columbus, Ohio, The Marble Cliff Quarries Co., 26,493

Ellis Plant, Zanesville, Ohio, Zanesville Gravel Co., 26,195

Cottonwood Heights Plant, Salt Lake City, Utah, Utah Sand & Gravel Products Corp., 26,047

Marshalltown Plant, Marshalltown, Iowa, Concrete Materials & Construction Div., American-Marietta Co., 25,478

Ottumwa Plant, Ottumwa, Iowa, Concrete Materials & Construction Div., American-Marietta Co., 24,108

Allegany Plant "A," Allegany, N. Y., The Buffalo Slag Co., Inc., 24,030

Shippingport Plant, Shippingport, Pa., The Shippingport Sand & Gravel Co., 23,224

Midway Plant, Midway, Wash., Freeway Concrete Supply Co., 23,183

Starbrick Plant, Warren, Pa., General Concrete Products Corp., 23,004

Lytle Creek Plant, Rialto, Calif., Owl-Service Rock Co, 21,726

Waterloo Plant, Waterloo, Iowa, Concrete Materials & Construction Div., American-Marietta Co., 20,996

Vass Plant, Vass, N. C., Cumberland Gravel & Sand Co., 20,835

Yorba Linda Plant, Yorba Linda, Calif., Consolidated Rock Products Co., 20,549

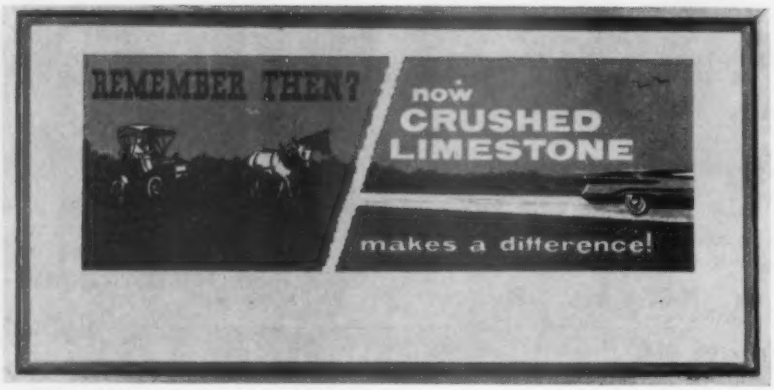
Dodge City Plant, Dodge City, Kans., Miller Sand & Gravel Co., 20,540

The Competition

Any bank, pit, or dredge plant operating unconsolidated sand/or gravel deposits in the United States may enter this annual safety competition for sand and gravel plants, sponsored and conducted by the U. S. Bureau of Mines. To be eligible for awards, however, the plant

(*Concluded on page* 131)

Aglime Use Boosted by Iowa



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IOWA Limestone Producers Association, Inc., has developed six billboard posters for use in 1962—all in color. The poster program has been reported by an officer of the association to have proved most effective for its members in the last 13 years in terms of producer identification and product differentiation between aglime and road-building stone in the public mind.

This colorful series, to be run as in the past on a two-month display basis for each of the six posters, stresses lime for agricultural use in an effort to educate "Mr. Farmer" and convince him that fertilizers will work better if used in conjunction with aglime.

Available to members of the association and nonmembers anywhere, all of the six displays have a space for the producer's name and address—the shorter the name and

1. The January-February poster is the only one that stresses crushed limestone for non-agricultural uses. The message and illustrations feature the advantages of crushed stone on roads over untreated mud roads of earlier days.

2. The March-April sign is an attempt to induce farmers to use aglime on their land before the fertilizer is applied.

3. Again, in the May-June display, aglime is stressed. This one illustrates the advantages of liming—and improving—pastures for beef cattle.

Association Billboard Posters

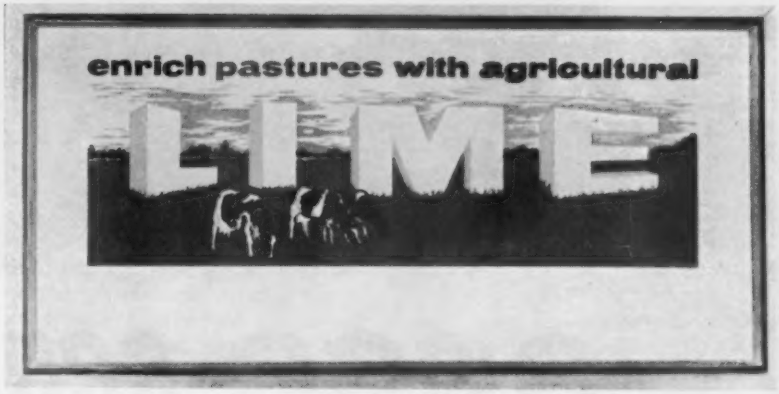
address, the larger the lettering. It is said that the posters are designed for easy visibility at distances of 100 yd. or more from the highway.

The 1962 series is available to I.L.P.A. members at $10 each and $14 each for nonmembers, plus a small makeready charge for name imprinting. It is not mandatory to purchase all of the six signs; the buyer may select them according to his own preference.

After the prospective user has made space rental arrangements with an outdoor posting company, the displays are shipped to the posting company at the latter's expense.

Nonmembers in any area who would like further information should contact Robert Miller, executive secretary, Iowa Limestone Producers Association, Inc., 106 Gladstone Building, 608 East Locust Street, Des Moines 9, Iowa.

4. During July-August, the association once more features its name, and breaks up the word "limestone" and defines its usage for farms and roads most effectively.



5. In the September-October poster, the bold letters spell out another strong appeal for aglime application on farm lands.

6. The November-December sign, as in the past, is a huge non-commercial Christmas card expressing the season's greetings—a "soft sell" display, also with space for the user's name.

Star of so many long run performances

SECO SCREENS

The SECO name will probably never end up in lights on Broadway. But aggregates producers from Maine to California can testify to their SECO SCREENS' ability to consistently perform year in and year out. And SECO SCREENS are not primadonnas . . . they're not temperamental or touchy . . . the rougher the going the better they like it! But don't take our word for it . . . ask your fellow-producer in the next seat what he thinks of SECO SCREENS. Chances are he'll tell you SECO is the star of his show, too.

ADDED ATTRACTION . . .

No need to worry about spare parts with SECO SCREENS. On those occasions when you'll need a part, remember, SECO ships standard parts the SAME DAY YOU ORDER THEM!

Send for 4-bearing Catalog No. 205
or TWIN BEARING literature TB-21

SCREEN EQUIPMENT CO., INC.
Buffalo 25, New York

SECO
PRODUCER PROVEN
VIBRATING SCREENS

GLOWING FUTURE Predicted for Lightweight Aggregates During E.C.S.A. Meeting

ENTHUSIASTIC forecasts that producers of expanded clay and shale lightweight aggregates can look ahead to years of consistent and substantial growth highlighted the mid-year meeting of the Expanded Clay and Shale Association, held on July 20 and 21 at the Americus Hotel in Allentown, Pa. The two-day sessions attracted one of the best attendances in the history of E.C.S.A. President Melvin Cruzen of Lightweight Aggregate Corp., Detroit, presided.

Three speakers kicked off the meeting on the opening morning. The first was Richard E. Miller, division sales manager of Lehigh Materials Company, Tamaqua, Pa., producers of Lelite. Mr. Miller described the expansion of markets for lightweight aggregate in the East Coast area and the widening field of uses for the product in a paper entitled *Selling Lightweight Aggregate in the Smaller Sizes*. He traced Lelite's beginning and research back to 1929, when The Lehigh Coal and Navigation Company began investigating outlets for the quality shale produced as a by-product of anthracite. This investigation led to a pilot plant installation in 1941 and subsequently (1948) the erection of Lelite's present $1,600,000 plant.

The first few years were trying ones, Mr. Miller said. Getting architects acquainted with the advantages of lightweight aggregates and convincing skeptical producers were two main challenges. Gradually, there came acceptance in the big metropolitan areas such as New York. Engineers, architects, and builders found the trowel trades more amenable to handling lighter weight masonry units; because 8-in. lightweight units may weigh as much as 15 lb. less than conventional units, workers began to appreciate the considerable savings possible in footing and frame cost of multistory buildings in which masonry was used for backup and partitions.

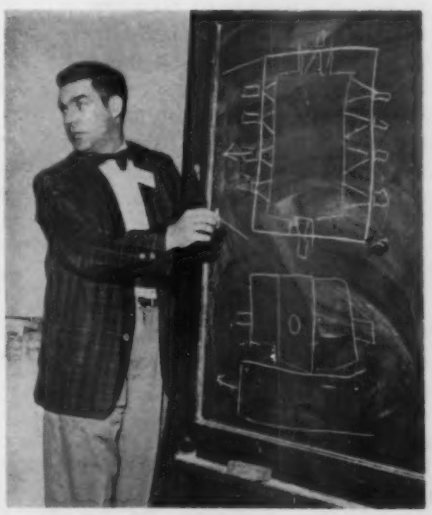
Mr. Miller noted that nailability is an economy-producing feature of lightweight units, making attachments and inserts less expensive. The units can also be cut or ground on the job less expensively. Moreover, there is less heat loss, which has much significance in areas where heating plants must be operated eight months a year.

Mr. Miller said, "Today, lightweight expanded clay or shale . . . are specified without question by architects throughout the eight-state area we serve. We have finally come into our own. For the last four years, we have sold out our production of Lelite. Of our 1961 tonnage, 60 percent will go into lightweight structural concrete and the remainder into block, precast, and specialty sizes. For 1961, it looks very much as if we will be in short supply on all sizes." He noted that two of the most recent projects employing Lelite structural concrete are the Guggenheim Museum in New York City, designed by Frank Lloyd Wright, and the George Washington Bridge.

Sand size, or $\frac{3}{16}$-in. by 0 material, which is the smallest sizing and which accounts for about 10 percent of this typical producer's annual output, is and traditionally has been the hardest size to sell, Mr. Miller said. However, aside from its use by precast producers, it has been successfully promoted in specialty uses such as refractory work and refractory castables. The sand size has won a limited market for horticulture purposes. Most local florists are using it in their flower

←

Among those participating in the recent Allentown, Pa., meeting of the Expanded Clay & Shale Association were William F. Atkins, Lansford, Pa., left, a past president of the group; Richard E. Miller, center, division sales manager, Lehigh Materials Company, who was one of the speakers; and Walter Zeigler, Building Products Company, York, Pa.



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Lucas E. Pfeiffenberger, technical consultant, E.C.S.A., presented a preliminary report on progress to date in the association-sponsored research program to determine unit weights.

beds to "start" young plants. It is also being promoted with increasing effectiveness for sludge-drying beds at sewage treatment plants. The main outlet, however, for sand-size lightweight aggregate, Mr. Miller stated, has been on running tracks. "Architects have taken to this application most enthusiastically, and we have been averaging 15 to 20 tracks per year. We take our sand and mix it two parts Lelite and one part approved loam for the top dressing of the running track. In the last year, we have resurfaced the running tracks of many leading colleges and universities in the East."

Lucas E. Pfeiffenberger, technical consultant for the association, gave a report on American Society for Testing and Materials activities, based on the recent meetings in Atlantic City of Committees C-9, which deals with specifications on lightweight aggregates and early concrete, and C-15, which covers masonry units.

He also gave a preliminary report on the progress to date of an association-sponsored research program being conducted in a laboratory to determine unit weights. Architects are not able to tie down unit weights of lightweight concrete in service, he pointed out. Producers can give plastic weights and oven-dry weights; to emphasize the range involved in this category, he noted that the plastic weight of a typical clay and shale aggregate was 117.5 lb. per cu. ft., while the oven-dry weight was 110.7 lb. per cu. ft.

Referring to two cylinder specimens, he said that oven drying for 72 hours in a ventilated oven showed a variation in humidity of from 22 percent to 60 percent. In each case, on submersion the unit weight increased over plastic weight. Mr. Pfeiffenberger said that it is increasing practice to determine weights in 11 to 16 days instead of waiting for 28 days, as formerly. This is done by accelerating drying under controlled conditions.

During the A.S.T.M. meetings in Atlantic City, intensified attention to uniform laboratory practices was recommended. Some labs have poor air circulation which gives a false relative humidity indication. "There must be strictly 50 percent relative humidity and 73.4 deg. F. temperature maintained at all times for accurate results," the E.C.S.A. consultant emphasized. He observed that the committee on lightweight aggregates has been divided into three units: Insulating Aggregates, Test Methods for Lightweight Concretes, and Specifications for Lightweight Aggregates and Structural Concrete.

The third speaker for the opening sessions was Ernest Gruenwald, technical services manager for Lone Star Cement Corporation, New York City. "Recent years have seen a tremendous growth of interest in lightweight structural concrete, so that today there are not sufficient quantities of structural lightweight aggregates available to fill the demand," Mr. Gruenwald said. "The importance of lightweight aggregates for structural concrete has found recognition by the establishment of A.S.T.M. Specifications (C330 and 60T) and by the American Concrete Institute in its *Recommended Practice for Selecting Proportions for Structural Lightweight Concrete*. (ACI 613A-59). Structural lightweight concrete must of necessity be a high-quality concrete and can be obtained by following the well-established principles of concrete technology."

Mr. Gruenwald said that four problems may be involved in the design of lightweight concrete mixture: (1) What mix is necessary to produce concrete of proper strength for given work? (2) With given materials, what proportions will give the best concrete at minimum cost? (3) With different lots of materials of different characteristics, which is best suited for the purpose? (4) What is the effect on strength of concrete from changes in mix, consistency, or size and grading of aggregates?

"The increased use of lightweight aggregates in structural concrete was paralleled by a large amount of research work carried out at various agencies such as the Bureau of Reclamation, the Portland Cement Association, various universities, and in particular by the producers of lightweight aggregates," Mr. Gruenwald stated. "This research work has established certain fundamentals which permit us to consider lightweight aggregates as an engineering material. The basic data concerning the mix design will, of course, vary with the properties of the particular lightweight aggregate."

An interesting description of highlights of a five-weeks' tour of Soviet Union industry provided the concluding minutes of Mr. Gruenwald's paper. He described Russia as a "large industrial complex," with cement-making facilities that are comparable to those in America. Russia, with its abundance of manpower, may use 600 employees in a plant which in the United States would employ no more than 200. Beauty of design is no consideration in construction, and box-like precast concrete dwelling units are a common sight. He said the Russians, who lost 70,000 villages during World War II, have a long way to go before overcoming their shortage of modern housing, but that they are determined to get on with the job. Engineers are generally friendly and allow picture-taking without restriction, but the ever-present "political" observers say, "Nyet."

The second session of the meeting involved an open forum discussion under the chairmanship of B. K. Powers, vice-president of E.C.S.A. and vice-president of Virginia Lightweight Aggregate Corp., Roanoke, Va. In nearly two hours of give-and-take questions, a wide range of subject matter was developed.

What's the answer to full efficiency from the ignition bed?

What makes the most effective fuel ignition mixture?

What percentage of operating hours has been found to yield the top plant productivity?

What production per man-hour should a good, modern plant expect to attain?

What is the largest size of raw material being put in sintering machines for lightweight aggregate production?

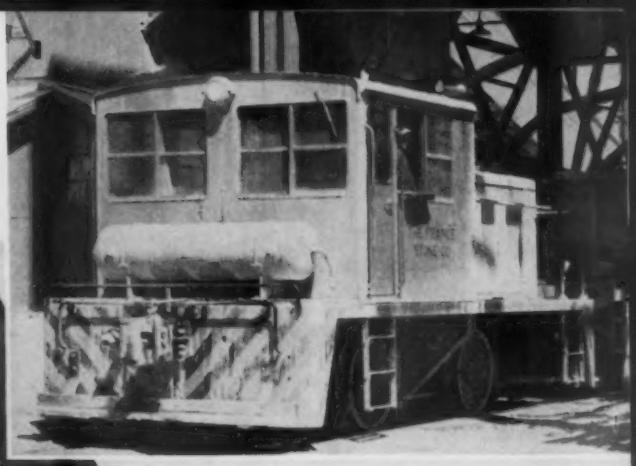
What has been the experience on lightweight aggregate use in prestressed concretes?

These and many other inquiries were aired.

On Friday a special bus took the group to Tamaqua for a tour of the Lelite plant. After luncheon at the Edgemont Club in nearby Lansford, visitors inspected the new

(*Concluded on page* 131)

The smooth, steady power of this Plymouth Diesel Hydraulic Locomotive assures dependable, capable in-plant haulage at the Indiana quarry of a leading stone company. A total of nine Plymouth Locomotives are in service with this company in their widespread quarry operations.



Plymouth proves its power in rugged quarry hauling

Leading quarry operators everywhere rely on the smooth, dependable power of Plymouth Locomotives for their track haulage, the backbone of quarry production. With peak efficiency, they get the extra bonus of substantial fuel savings and minimum maintenance costs.

See for yourself how Plymouth Diesel Locomotives can improve your material handling operations and save money. There is a standard model exactly fitted to your operations, weights from 3 to 100 tons with power matched to each size. An outline of your haulage operation is all that's needed for Plymouth engineers to give you a *cost-cutting analysis.*

Contact Plymouth Locomotive Works, Division of The Fate-Root-Heath Co., Dept. A-15, Plymouth, Ohio.

PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE®

*Torqomotive Drive: Plymouth Transmission coupled to a Hydraulic Torque Converter.

RAIL POWER

PLYMOUTH LOCOMOTIVES in Progressive Industry throughout the world

WHEN TIME COUNTS
RELY ON
HENDRIX
DRAGLINE BUCKETS
Hendrix Lightweight Dragline Buckets
¼ to 40 Cubic Yards Perforated or Solid
HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

N.S.A. Safety Contest

(*Concluded from page* 121)

worked 3,232,972 man-hours during 1960, or an increase of 820,113 man-hours compared with the 2,412,859 man-hours worked by the 49 plants that participated in 1959.

In 1960, these plants had the fewest disabling work injuries (26) in the history of the contest. They also had the lowest number of man-days of disability (1,459) charged. The average number of days lost per disabling injury (fatal and nonfatal combined) at the operations was 56, compared with 246 days of disability in the 1959 competition. Only one permanent partial injury of 400 man-days of disability was charged. This resulted from a machinery accident.

Of the 25 temporary total injuries at slag operations during 1960, 7, or 26.9 percent, were caused by slips or falls of persons; 6, or 23 percent, resulted from falling materials or objects; and 3, or 11.5 percent, occurred from handling materials or objects. These 16 injuries caused 61.5 percent of all injuries. Falling materials or objects caused 581 days of lost time; machinery, 439 days; slips or falls of persons, 134 days; and handling materials or objects, 90 days. The total of 1,244 days was 85.3 percent of all time lost or charged for the 49 plants competing in the 1960 National Slag Association Safety Competition.

Competition Rules—The competition is open to any slag processing plant. Plants are classified into one of two groups: Class A—those plants operating 60,000 man-hours or more during the year; and Class B—those plants operating fewer than 60,000 man-hours.

The plant with the best safety record in each group is awarded a bronze plaque provided by PIT AND QUARRY magazine, and each employee and official at the winning operation receives a Certificate of Accomplishment in Safety from the Bureau of Mines. The Bureau also awards Certificates of Achievement in Safety to each slag plant operating 20,000 man-hours or more during the competitive period without a disabling injury. Certificates of Accomplishment in Safety are likewise provided by the Bureau for all employees and officials of plants working 20,000 or more injury-free man-hours. Eligibility in the competition is maintained by submitting quarterly reports on worktime and a report for each disabling work injury at the plant. Standard injury report forms, supplied by the Bureau of Mines, or a copy of the participant's report prepared for state compensation commission or insurance carrier, may be used to report information on injuries.

A plant may be enrolled by applying to the Branch of Accident Analysis, Division of Accident Prevention and Health, Bureau of Mines, U. S. Department of the Interior, Washington 25, D. C.

Winning S-G Plants

(*Concluded from page* 123)

must operate at least 20,000 man-hours during the contest year.

Competitors are divided into two groups, (1) bank or pit and (2) dredge. Within each group, the operation with the best safety record wins a Certificate of Achievement in Safety, and each of its employees and officials receives an individual Certificate of Accomplishment in Safety. Whenever two or more operations are injury-free, the operation working the highest number of man-hours is the winner. Certificates of Achievement in Safety also are awarded to the other plants operating 20,000 man-hours or more throughout the contest without a disabling work injury. All awards are provided by the Bureau of Mines.

Enrollment applications and complete rules governing the competition can be obtained from the Branch of Accident Analysis, Division of Accident Prevention and Health, Bureau of Mines, U. S. Department of the Interior, Washington 25, D. C.

E.C.S.A. Meeting

(*Concluded from page* 128)

$1,500,000 Greenwood Breaker, source of Lelite's shale. This heavy media preparation plant, constructed just last year, has a productive capacity of nearly 6,000 tons of finished anthracite coal per day.

The strip mine operations of Greenwood, which reach a vertical depth of nearly 800 ft. and which are serviced by a fleet of 30-ton trucks working on a round-the-clock basis,were inspected with considerable interest by the group.

The meetings adjourned late Friday upon the group's return from the plant and strip mines tour. At a subsequent meeting of the E.C.S.A. board of directors, the group authorized a continuance of the unit weight testing program, all data to be made available to A.S.T.M. Sub-Committee 3-F (Lightweight Aggregate and Lightweight Aggregate Concrete.)

T. R. Berger, executive secretary, in his report for the six months of 1961, said, "The general feeling seems to be that the volume of the lightweight aggregate industry is on the way up and that by the end of 1961 our expanded-clay and -shale lightweight output will be at virtually capacity levels. One thing is certain: competition in the months to come will be keener than ever. A number of new lightweight aggregate plants are scheduled to go into operation very soon, particularly in the populous eastern coastal states, wherein reside about one-fifth of the nation's people. This could well mean an intensity of competition for new and existing markets unprecedented in the relatively youthful history of the lightweight aggregate industry. This is going to require each and every lightweight aggregate producer to evaluate seriously and thoughtfully his marketing techniques, his plant efficiency, his cost picture, and his basic philosophy of action."

Mr. Berger added that he could not recall any period in which there was a greater flow of announcements and reports on new or projected lightweight aggregate plant construction. The rate of growth in terms of numbers of plants, particularly in concentrated sections, is impressive, he said.

Miami Beach was chosen as the locale of the association's annual meeting, to be held on Friday and Saturday, January 12-13, 1962, just prior to the N.C.M.A. convention in the Florida city.

Morris Machine Works specified this Ni-Hard iron casing for a high-velocity dredge pump to be used with a 20-inch pipe line. To give you an idea of its size, that's John Kerr, 6-foot, 9-inch professional basketball player standing inside the casing.

Why Ni-Hard iron is a giant for abrasion resistance

The plain fact is that Ni-Hard* nickel-chromium iron alloy is one of the hardest cast materials you can buy. This means you get uniform wear and good contour retention right along with abrasion resistance. That's why Ni-Hard iron was chosen for the dredge pump casing shown above used in a 20-inch diameter pipe line.

From dredge and slurry pumps to ore-processing equipment, it pays to use Ni-Hard iron... because it can slash costly downtime and parts replacement to rock-bottom. Available in a variety of shapes and sizes, Ni-Hard iron can be cast to your design specifications for such parts as mill liners, grinding balls, pump impellers, chute liners and pipe.

Our 58-page booklet, "Engineering Properties and Applications of Ni-Hard," has a lot more facts on this outstanding iron. Just let us know and we'll be glad to send you a copy. It will show you how Ni-Hard iron can go to work in your operations.

*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street INCO New York 5, N. Y.

NI-HARD®

NICKEL MAKES CASTINGS PERFORM BETTER LONGER

Fred Gelzleichter, in charge of gravel plant operations, Spickelmier Industries, Inc.

Concrete products plant reports on DEISTER Screen operation:

"EXACT SIZING . . . NOT A PENNY FOR MAINTENANCE"

A well-deserved reputation for quality has made Spickelmier Industries, Inc. of Indianapolis one of the largest manufacturers of concrete products in the Midwest. Now in its 51st year, Spickelmier is able to maintain highest quality standards because it strives to control all factors of production from raw material to finished product. This, according to President Carl F. Spickelmier, is the reason why the company began its own sand and gravel plant operation in 1941.

Aggregate production has expanded steadily over the years, and Spickelmier now supplies outside customers as well as its own manufacturing needs from this plant. During the construction season a stockpile of 40,000 tons is kept on hand.

The full plant load of 150 tons per hour is fed to a three-deck 4′ x 14′ Type UF horizontal Deister Screen which was purchased in April, 1960. As the material passes across the screen it is sprayed with water at the rate of 400 gpm.

With screen deck openings of 1-1/4″, 9/16″ and 3/16″, the Deister Screen produces four finished aggregate sizes for Spickelmier. In describing this screen's performance, Yard Supervisor Fred Gelzleichter had this to say: "Our specifications call for exact sizing and that's what we get from this Deister. We haven't spent a penny for maintenance since the day it was installed."

Changing screen cloth is a lot faster too, according to Plant Operator Albert Gantz. "We can change the bottom screen on the Deister in about half an hour. On our other screen it takes a whole day to change the bottom screen deck because we must remove the top deck to get to the bottom one. Figure that in terms of production time and you can see why we like the Deister Screen."

DEISTER MACHINE CO.
1933 E. Wayne St., Ft. Wayne, Ind.

Enter 133 on card, page 149

Pit and Quarry's Research Director Jim Kostka examines the new Portland Cement Plant Map as it arrives from the printer.

JUST ARRIVED!

Newest Portland Cement Plant Map

Our latest edition of the popular PORTLAND CEMENT PLANT map is as new as tomorrow. It shows all the existing producing and distributing plants in the United States, Canada, Mexico and Puerto Rico, plus all plants under construction and expected to be completed by the end of 1962.

This new 33 x 44 inch map names and locates 227 producing and 116 distribution plants. It is priced as follows:

1—10 copies	$1.00 per copy
11—25 copies	.75 per copy
over 25 copies	.50 per copy

Please send a check or cash when you mail your orders; this will eliminate future billing.

We will be happy to fill your order.

FEATURES OF NEW CEMENT PLANT MAP

- Alphabetical listing, by city and state, for each producing and distributing plant.
- Capacity given for each producing plant. Future capacities given, too, when available.
- Plant's process, wet or dry, is indicated for each producing plant.
- Brand name, or names, shown for each producing plant.
- All producing and distributing plant locations shown on an outline map.

PIT AND QUARRY PUBLICATIONS, Inc.

431 S. Dearborn St. Chicago 5, Ill.

Efficient Hauling-Stripping

At Nello Teer's Raleigh Quarry

THE Nello L. Teer Company, of Durham, N. C., is one of the larger heavy construction companies in the United States, and is also an important producer of aggregates, operating several crushed stone plants in North Carolina.

The Raleigh quarry operation was started a little over five years ago to serve the company's needs in the Raleigh-Durham area. The quarry employs an average of thirty-five men and works five ten-hour days a week. The material supplied is crushed granite and is usually made in ten different sizes. In addition to this, rip-rap and screenings are made. The material is shipped both by truck and rail within a radius of 45 to 50 miles of the quarry. Not only is the stone used on Nello Teer jobs, but it is sold to county, state, city governmental bodies, local contractors, etc. During 1960 the Raleigh quarry produced in the neighborhood of 475,000 tons.

The quarry face ranges up to 125 ft. in height and is worked in 20- to 26-ft. benches. Drilling is done with Gardner-Denver PR 123 Air Trac drills supplied with air by 600-c.f.m. Ingersoll-Rand and Chicago Pneumatic compressors. The 2½-in. holes are spaced 6- by 6-ft. Various makes of 60 percent gelatin explosives are used. Secondary breakage is done with a drop ball handled by a Lima Model 34 crane. The stone is loaded into trucks by a 3½-cu. yd. Bucyrus-Erie 71B diesel shovel.

The truck fleet consists of three new LeTourneau-Westinghouse Model 27 Haulpak trucks with 27-ton end-dump bodies. These have automatic transmissions, power brakes, power steering and Hydrair suspension which combine to make them fast, easy to handle and easy riding.

The distance from the quarry face to the primary crusher averages 0.3 miles, most of which is a ramp out of the quarry with an average grade of 10.5 percent. The truck time from the quarry to the crusher—with an average 25-ton load—averages 3.0 min. The return trip (empty) averages 1 min. 45 sec. Loading time is about 3 min. when loading drop ball material and 2¼ min. when loading from the muck pile.

The haul roads are maintained in very good condition and road oil is applied to keep dust down. A Caterpillar D-6 is used in the quarry for clean-up work and pushing the material into the bank for loading by the Bucyrus shovel.

The Haulpaks dump the granite rock into the hopper of a 46-in. by

This view of the Raleigh quarry shows its depth. Note the truck in the haulage road in the background.

The 3½-cu. yd. diesel shovel loading stone at the face into one of the three 27-ton haulage trucks.

Trucks dump to the feeder of a 30- by 42-in. jaw primary crusher. A part of the crushing and screening plant is visible in the background.

18-ft. Telsmith apron feeder which feeds the Telsmith 30-inch by 42-inch jaw crusher. After primary crushing the granite is conveyed to a 5-foot by 12-foot Telsmith Vibro-King 3-deck screen where the 1½-inch and under size is taken out. All over 1½-inch goes into a 489-S Telsmith Gyrasphere crusher. This discharges onto a conveyor which feeds a 5-foot by 16-foot triple deck Telsmith Vibro-King screen. This screen enables them to make any size material simply by changing the screens. The oversize material from the screen is conveyed to a 48-inch FC Telsmith Gyrasphere crusher where it is further reduced. From this crusher the material is conveyed back onto the conveyor that goes to a 5-foot by 16-foot Vibro-King triple deck screen. Products of this screen drop into three 30-ton hoppers. The hopper used depends upon the size of material being made.

It is the job of three Ford T-750 trucks equipped with Marion 8-yard bodies to carry the material from the hoppers to stockpiles for each size material the company produces. A Marion 35-M crane which is equipped with a 45-foot boom and 1½-yard clamshell bucket is used for rehandling.

The loading of stone into trucks is done with two rubber-tired front end loaders. One is a Michigan 175-A which has a 2½-yard bucket and the other is a Caterpillar 944 Traxcavator equipped with a 2-yard bucket.

During slack periods the Bucyrus-Erie 71-B shovel and the three Le-Tourneau - Westinghouse Haulpak trucks are used for stripping overburden. This varies from 10 to 20 feet deep in some places. It is earth and contains some large rocks and boulders but does not have to be drilled and shot before loading.

The distance from the shovel to the dump is in the neighborhood of 1500 feet and the average time for the Haulpaks to make the haul to the dump was 1 minute 45 seconds to 2 minutes. The average dumping time was 25 seconds. The return trip from the time the truck started to move from the dump until it was back almost to load position, required 1½ minutes to 1 minute 45 seconds depending upon whether there was waiting time at the ramp.

The same 3½-cu. yd. diesel shovel and the same trucks are used during slack periods for removing overburden from the deposit.

Green Bag's Neville Isl. Plant Undergoes Major Rebuilding

The Green Bag Cement Company's plant on Neville Island, Pittsburgh, Pa., is undergoing a multi-million-dollar rebuilding job. Green Bag Cement is a division of the Marquette Cement Manufacturing Company.

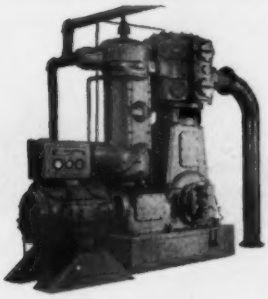
Revamping began early this year after Marquette bought the plant from Pittsburgh Coke and Chemical Company. Marquette plans to boost the plant's clinker capacity from about 960,000 tons to 1,600,000 tons annually.

As part of its slag sales expansion program, United States Steel Corporation will market the blast furnace slag now processed by the Consumer Division of Vulcan Materials Company at the Gary Steel Works of U. S. Steel. The plant was built originally by the Gary Slag Company in 1946, and was purchased by Consumers Division two years ago.

A new quarry, owned by the Melton Sand Company, recently went into operation in Morgan County near Wartburg, Tenn. Truman Melton is the proprietor of the firm.

Which... ATLAS COPCO COMPRESSOR

meets your needs best?



AR Heavy-Duty Compressors

More air per horsepower than any comparable compressor! For continuous, full-load operation. "L" angle, 2-stage, double acting. Water cooled. Standard models provide 382 to 3210 cfm free-air delivery at 100 psi; only 76-590 hp required! (Can be supplied for other working pressures on request.)

What's your compressor requirement? Need an installation large enough to provide air for all your needs? Or would a small, compact unit for auxiliary operation solve your immediate problem? Either way—and for a wide range of applications between these extremes—Atlas Copco has the compressor for you!

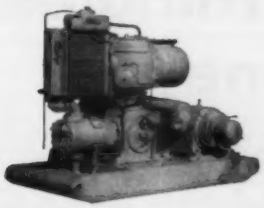
No matter which you choose, you'll get these proven advantages from Atlas Copco:

(1) More air per horsepower—less power consumption than other comparable units!

(2) Really low maintenance (one example—$3.10 after 10,000 hours' operation)!

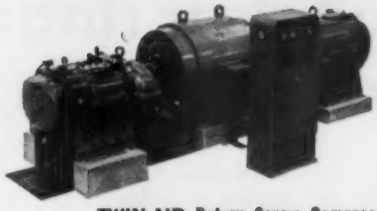
(3) Specifications are guaranteed free-air delivery—you get exactly what you order!

Get all the facts now—and compare! The coupon below will bring you a free catalog. (No obligation, of course.)



AR-L Heavy-Duty Compressors

Same basic construction as the AR Series, but provided with an air-cooled intercooler and air-cooled radiator for the cylinder water. Fan on compressor flywheel cools radiators. Perfect for arid areas or where difficult to bring in water. Both stationary and skid-mounted models available.



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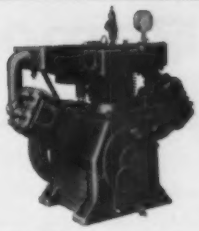
Brand new! "Twin-Air" Compressors offer capacities from 6,900 to 19,400 cfm at working pressures up to 115 psi. And, you get completely oil-free delivery of air or gas, since no lubrication is required — timing gears maintain small clearances between precision-mounted rotors, eliminating friction (and the necessity of oil) in compression chamber.



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Stationary, or skid-mounted compressors for use where air demand is between 50 and 300 cfm. Totally air-cooled. Cylinder arrangement designed for smooth, vibration-free operation. Compact, rugged—for continuous, 24-hour trouble-free service. Highly efficient; low on maintenance costs.

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New! Fundamental improvements over conventional heavy-duty compressors reduce power requirements (18.3 hp/100 cfm at 100 psi, full load); provide totally enclosed design; and save on floor space. Capacities to 1,140 cfm; standard instruments and safety devices.

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Please send me ☐ Short-form catalog ☐ Detailed information on the_____Series

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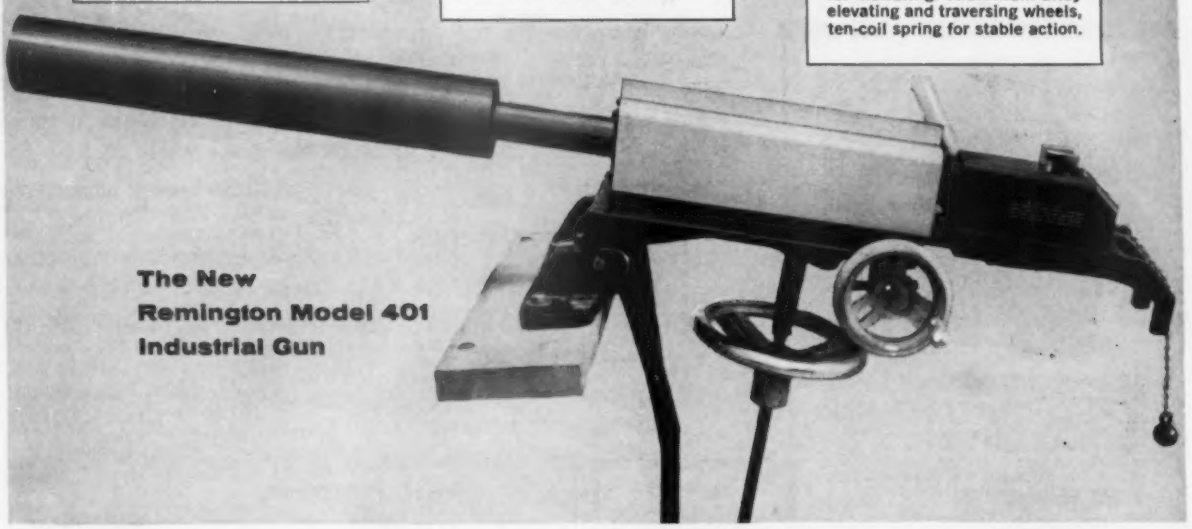


The New Remington Model 401 Industrial Gun

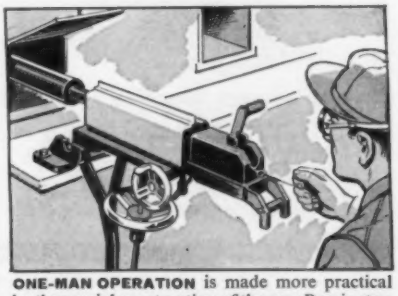
Remove clinker rings in minutes ...save time and money!

You save valuable kiln downtime and man-hours in removing clinker build-ups with the new hard-hitting Remington Model 401 Industrial Gun. It's designed for use in rotary kilns for cement and lime manufacture, refractories and lime-sludge operations. This newly designed gun brings rings and other troublesome kiln formations down in minutes!

No need to wait until the kiln cools. In fact, there's no need to turn off flame or stop rotation until ready to fire. To operate, just load—aim—FIRE—and up to 9,000 ft.-lbs. of knockdown power smashes into the clinker build-up. A few well-placed shots and rotation of the kiln will cause the ring to crumble. Then you're back on a full-time schedule!

Here's the easy, cost-saving way to remove build-ups—without damage to kiln or lining. The new Remington Industrial Gun and one man can save you money.

For information about the advantages of this new gun and how it will help solve your clinker build-up problems, write to the address below.



ONE-MAN OPERATION is made more practical by the special construction of the new Remington Industrial Gun • Spade grip and special corrugated operating handle reduce strain for the operator • Safety features include provision for a protective shield which can be fitted to kiln opening to block heat and clinker fragments • Mortised breech block makes it impossible to fire when breech is not fully closed • New-type ejector gives positive ejection of fired shell. Simpler in design—has longer life.

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Magnum Shell—new, improved—3-oz. special lead-alloy slug—delivers 9,000 ft.-lbs. of energy accurately, every shot.

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All shells now available in new easier-to-handle packing.

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Legal Decisions
On Industry Problems

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Cannot Contract Against Negligence

A FEW weeks ago a higher court rendered an outstanding decision to the effect that a property owner cannot make a valid contract relieving or excusing himself from damages to a contractor caused by negligence. This same rule of law was held applicable to states, counties and cities.

For illustration, in *Sandel* v. *City*, 129 So. (2d) 620, it was shown that a contractor was awarded a contract by a city to construct a pumping station for $245,375. This project was a portion of the over-all extension and improvement of the city's sewerage system. The contract imposed upon the city the obligation of furnishing certain concrete pipe to be installed by the contractor. The pipe specifically was 5 joints of 60-in. reinforced concrete pipe in 16-ft. lengths weighing approximately 1,360 lb. per foot of length. The pipe was not a stock item, and special manufacture was required in order to meet the specification. A clause in the contract between the contractor and the city very clearly provided that the city would furnish the concrete pipe and that the contractor "will have to accept the risk of any delays caused by the rate of progress of the work," and that in the event the contractor is delayed in the prosecution and completion of his work because of such conditions, he shall have no claim for damages or contract adjustment.

Still another clause in the contract provided: "The 60-in. concrete pipe will be delivered to the trench side by the pipe manufacturer. The contractor's attention is directed to the fact that he will have to accept the risk of any delays in delivery of equipment to be furnished by the owner (city) and that in the event he is delayed in the prosecution and completion of the work because of this condition of delay, he shall have no claim for damages or contract adjustment, other than an extension of time and the waiving of liquidated damages for and during the period of time occasioned by such delay."

The testimony showed that the contract fixed the date of completion of the job, and pursuant to the issuance of a work order on August 14 the contractor commenced his work and operations on August 15. The contractor's initial operation was the excavation of a hole 25 ft. 6 in. below the surface of the ground. At a point 10 ft. below the surface of the ground the hole was extended an additional 15 ft. in two directions, and an additional 8 ft. in the other two directions. After the excavation was completed, a 3-ft. concrete slab or floor was poured at the bottom, then 2-ft. thick concrete walls were formed and poured. The contractor proved that the walls and the bottom were completed about November 15. In other words, the contractor's structure had progressed to the point where the installation of the pipe could have been done any time after November 15. On December 7 the contractor addressed a letter to the attention of Charles B. Foster, the engineer representing the city on the job, advising him that the work had proceeded to the point where the pipe must be installed, and asking that it be delivered to the job site as soon as possible. The city at that time had not ordered the pipe. It was not until March 7 that data was furnished to the Tex-Crete Company and an order for the pipe was not given until April 10. Delivery of the pipe was made the following June 20.

The contractor sued the city for heavy damages and proved that the construction period was extended 272 days by reason of a 196-day delay in delivery of the pipe; that actual installation of the pipe under satisfactory conditions could have been performed within ten hours; and that by reason of the city's delay he encountered a period of excessive precipitation, thereby necessitating extra labor and services. The contractor also proved that in the four months preceding actual delivery of the pipe the necessity of leaving the excavation open caused intense deterioration in soil conditions and presented almost impossible conditions for pipe placement, thereby requiring large amounts of concrete for stabilization and necessitating additional labor and other expenses. Further, it was shown that the conditions brought about by the excessive rainfall required additional pumping equipment and services.

The lawyers for the city contended that the contractor could recover no damages, because the above mentioned clauses in the contract relieved the city from fault and damages. The higher court refused to agree with these contentions and held the city liable to the contractor for $11,856 damages. This court said:

"It is contrary to public policy to allow a contractee (city) to stipulate exemption from negligent acts which cause injury. Undoubtedly, the only effect that can be accorded to the non-liability provisions is that it was intended to be operative where the delay is not caused by the owner (city). Accordingly, it is our finding that appellant (city) rendered itself liable for such damage as has been properly proven."

Surety Is Liable

According to a late higher court decision a corporation is assured of having a building constructed exactly according to plans and specifications, if a reliable surety company has bonded the contractor.

For example, in *Boespflug Contracting Company* v. *S. Wilson*, 362 Pac. (2d) 747, Steeves and Wilson,

plaster contractors, furnished a bond issued by a surety company, and took a contract to do the plastering work on a hospital being constructed by the Federal Government in Alaska. The subcontractors, Steeves and Wilson, proceeded with such work until December 15, when plastering operations were discontinued for the winter. Shortly thereafter, the plaster cracked severely. Thereafter, Steeves and Wilson, in writing, formally abandoned the contract because of financial difficulties. The next day the surety company by letter employed the Boespflug Contracting Company to complete the work of the subcontractors. When the plastering work was completed and accepted as being satisfactory, the Boespflug Contracting Company put in a bill of $266,953.05. Although it was contended that this bill was too high, the higher court approved it saying:

"Since there was no agreement respecting the amount of compensation to be paid respondents by the appellants (surety company) for finishing the job, they are entitled to reasonable compensation therefor."

Sales Taxes Payable On Materials

An official of a large quarrying company asked: "What plan can we adopt to avoid paying the states' sales tax on the total charges to customers for materials and transportation of materials to the job?"

A leading higher court has held that if the transportation charges are kept separate from the charges for materials, sales taxes need be paid only on the charges for materials.

For illustration, in *Select Base Materials* v. *Board of Taxes,* 329 Pac. (2d) 65, the testimony showed that a company was engaged in the business of mining and selling decomposed granite from lands owned by it or held by it under mining leases. The company did not stockpile any materials, but upon receiving an order for decomposed granite mined the material and placed it directly on trucks to be hauled to the place designated by the purchaser. The company did not own any trucks but in all instances the material was hauled by a trucking company.

Further testimony showed that upon receiving the order a company's employee would phone the trucking company which would load the amount of the order onto its truck and give a delivery ticket in duplicate. This ticket contained the name of the consignee, the address to which the materials were to be transported, the purchase order number, if any, and a statement of the weight of the materials delivered. In all instances on the company's books the charges were broken down so as to separately state the price charged for the materials, the sales tax on those materials and the amount charged for transportation which in all cases was the exact amount paid to the trucking company.

In view of this testimony the higher court held that the company need not pay $10,446.45 sales tax which the state tax board contended the company owed on the combined cost for materials plus transportation charges. In other words, the court held that the company owed sales tax only on the selling price of the materials. The court said:

"Certainly those invoices which separately stated the price of the materials and the amount advanced by the company for transportation costs fully met the statutory requirement. Those that showed the tax on materials at a certain price per ton of materials required but a simple mathematical calculation by the buyer to segregate the transportation charge from the total for which he was billed. Those that only showed the tax and noted that it was on materials only did not require a complicated calculation."

Recovers Both Compensation and Damages

An official of a concrete block corporation asked: "If an employer carries insurance under the State's Workmen's Compensation Act can an injured employee recover both compensation and damages from his employer?"

The answer is no, but the em-

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News Reports from Operators Reveal Stamina of SECO Twin Bearing Screens

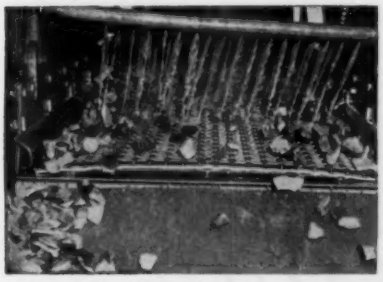
Now, you can expect and get a new kind of stout-hearted performance from 2-bearing screens.

That is, if they are SECO TWIN BEARING screens. Yes, actual results, reported to us by producers themselves, give strong proof that SECO design and engineering superiority really pay off . . . day after day, year after year where it counts . . . on the job. Today, with your own profits so dependent on operational efficiency, we believe it will pay you to get the full information about SECO TWIN BEARING screens.

"Over 1,000,000 tons without a whimper from our SECO TWIN BEARING screens" reports Jules Koczat of Buffalo Crushed Stone Corporation. "We've screened eight sizes of aggregate for 1½ years without a minute of downtime. We are so pleased we now have seven SECO TWIN BEARING screens on the job."

"We like the action and performance of this screen." Joe Schwendt, Sup't., Amico Sand & Gravel Co., Riverside, N. Y.

"This screen is a real screener. Elmer is very happy with it, and says they will be ordering more of them in a month or so." R. P. Fulton, Southern Machinery & Supply Co., Roanoke, Va.



"This sieve analysis is a real endorsement for SECO TWIN BEARING screens." K. K. Kagarise, General Sup't., The Standard Slag Co., Youngstown, Ohio.

"Our SECO TWIN BEARING screens are doing a real good job of screening. Our only replacement has been screen cloth." Paul Padgett, Purchasing Agent, Thompson, Weinman & Company, Sylacauga, Alabama.

"I never believed a 2-bearing screen could perform like this. We're averaging 120 TPH in three sizes of gravel plus concrete sand . . . with no trouble at all on our 3 x 10 Triple Deck model." Eric A. Krehbiel, President, Clarence Sand and Gravel Corp., Clarence, New York.

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Designed for Volume Low Cost Screening

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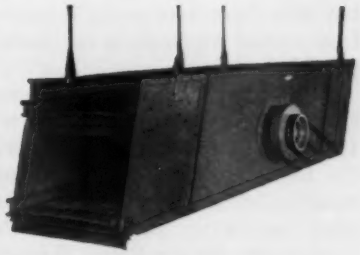
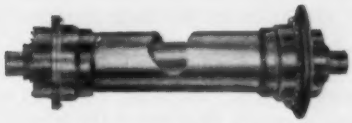
Single, double, triple and half deck variations. May be suspension or base mounted.



RIGID BOX FRAME CONSTRUCTION

Eliminates body distortion thus preventing undue stress on shaft assembly.



20%-30% HEAVIER AND STRONGER SHAFT

The heart of the screen, precision built with an extra margin of safety and with extra heavy bearings, too!

OIL BATH BEARING LUBRICATION

Provides more thorough lubrication for longer bearing life. Special flinger type seals prevent oil entering the tube assembly.

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VIBRATING SCREENS

SCREEN EQUIPMENT CO., INC., BUFFALO 25, N. Y.

ployee may elect to sue his employer for damages instead of accepting compensation under the State Workmen's Compensation Act. In other words, once the employee has filed an application for compensation he cannot sue his employer for damages. The suit for damages must be instituted before the employee files an application for compensation under the State Workmen's Compensation Act.

On the other hand, the fact that an employee receives compensation under the State Workmen's Compensation Act for an injury does not bar him from recovering damages from a third party whose negligence caused the injury.

For illustration, in *Orth* v. *Petter Crushed Stone Company*, 91 N. W. (2d) 463, the testimony showed the following facts: An employee, named Orth, was severely injured while working in the course of his employment for the Petter Crushed Stone Company. The injuries resulted in the loss of both of his legs and of his right arm. The Petter Crushed Stone Company admitted liability therefor and paid compensation to Orth to the extent of $10,000 under the State Workmen's Compensation Act.

Soon thereafter Orth sued a man named Carter for heavy damages on the grounds that the latter's negligence had caused the injury.

It is interesting to note that the higher court held Carter liable to Orth for $20,000 damages, saying that the fact Orth had collected $10,000 insurance under the State Workmen's Compensation Act did not bar or prevent him from suing Carter for damages, since the injuries were caused by Carter's negligence.

Restrictive Contract Is Valid

A few weeks ago a reader asked whether or not a restrictive clause in an employment contract is valid and enforceable. A recent court held that a contract between an employer and employee is valid whereby the latter agrees that he will not engage in a competitive business within a reasonably limited time after leaving the employment.

For example, in *Lassen* v. *Benton*, 346 Pac. (2d) 137, the testimony showed that a man named Benton signed an employment contract which contained a clause that in the event that this contract shall be terminated by either party, the employee agrees that he will not take competitive employment within twelve (12) miles of the city limits for a period of five (5) years.

In subsequent litigation, the higher court held this limitation clause valid and enforceable against Benton who attempted to operate a competing business after he ceased employment with Lassen.

Compensation Laws Broadly Construed

An official of a sand and gravel company asked this interesting question: "Can a former employee recover payment of compensation for an injury he received after he was discharged from his regular employment?"

Recently I located a higher court

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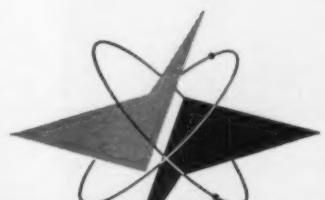
An Unprecedented Closed Circuit

Impressed by the potential value of closed circuit television but *depressed* by reports of high initial cost, expensive maintenance, constant requirement for difficult adjustments, and general unreliability? Then listen . . . to an unprecedented proposition from the world's oldest manufacturer of industrial closed circuit television: Indoor or outdoors, in any kind of weather with practically any degree of illumination, Diamond Electronics' all new Hawk 401 Utiliscope is *guaranteed on a money-back basis* to provide a sharp, clear picture of just about anything . . . perimeter barriers, gates, transfer points, loading docks, construction areas, vehicular movement, rooftops, hazardous areas . . . all from one safe, comfortable and convenient location. The Hawk requires no special housing, no special power supply, no special adjustments for changing light and weather conditions. Just plug it into an ordinary 110 V outlet and forget about it.

See for yourself. Call, write or wire and we'll arrange a demonstration within the week.



Diamond Electronics

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decision which answers this question in the affirmative, with a provision that the injury occurred directly or indirectly in connection with his former employment.

For example, in *Peter Kiewit Sons' Company* v. *Industrial Commission*, 354 Pac. (2d) 28, the testimony showed that one Fred was employed by the Peter Kiewit Sons' Company as a cement or concrete finisher on a construction project on a highway. One day a highway inspector employed by the state highway department told Fred that he was performing his work in a faulty manner and, after a verbal dispute arose between the two, the highway inspector requested the foreman to discharge Fred. The foreman thereupon discharged Fred and told him to wait in his car for his check which would be brought out to him. Fred walked to his car, put up his tools, and waited for his check. Within a few minutes the highway inspector, accompanied by an armed state highway patrolman, approached the car, started "talking ugly" in front of Fred. The highway inspector told Fred to get out of the car. Fred did so, and was struck several times and knocked down by the inspector, thereby receiving severe injuries. He filed suit to recover compensation under the State Workmen's Compensation Act.

During the trial it was contended by the lawyer representing the Peter Kiewit Sons' Company that Fred could not receive any compensation because he was not working on the job when injured and, further, he had been discharged before he was injured.

It is interesting to observe that the higher court decided, nevertheless, that Fred was entitled to compensation, saying:

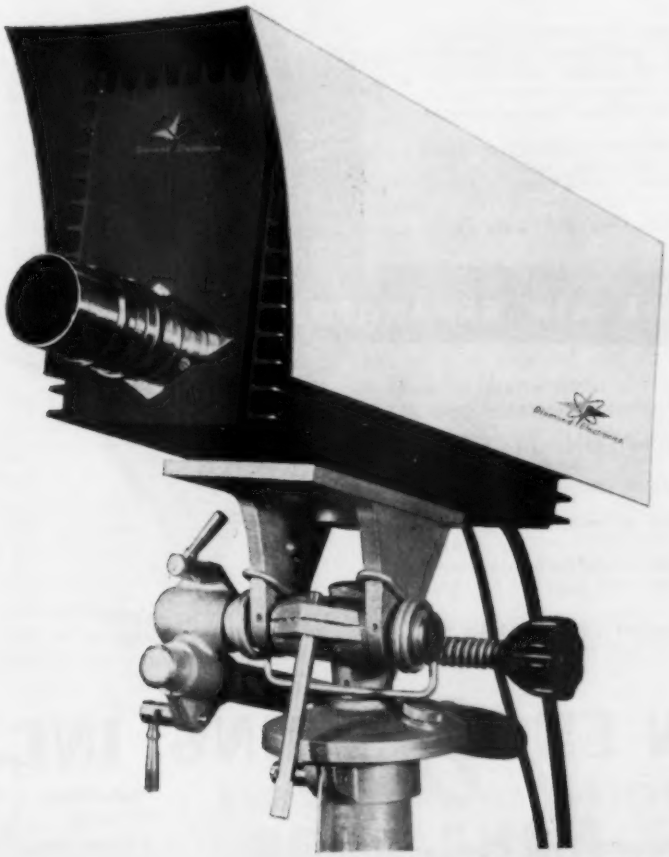
"It is not disputed that claimant (Fred) had formally been discharged from his employment prior to the time he sustained his injuries. It is clear that at the time of the assault, claimant (Fred) was properly in the work area and, for the purposes of workmen's compensation was still in the course of his employment."

This higher court went on to explain that injuries incurred by an employee while leaving the employer's premises; collecting pay; or getting his clothes or tools, within a reasonable time after termination of the employment are normally incidents of the employment relation. Furthermore compensation coverage is not automatically and instantly terminated by the firing or quitting of an employee. The employee is deemed to be within the course of employment for a reasonable period while he winds up his affairs and leaves the premises after being discharged.

For comparison, see *Field* v. *Charmette*, 245 N. Y. 139. Here an employee was assaulted three or four feet from the door of the employer's plant by another employee with whom a work dispute had taken place earlier in the day. The employer contended that it was not liable for workmen's compensation because the assault occurred on a

permits...

Proposition In Television...



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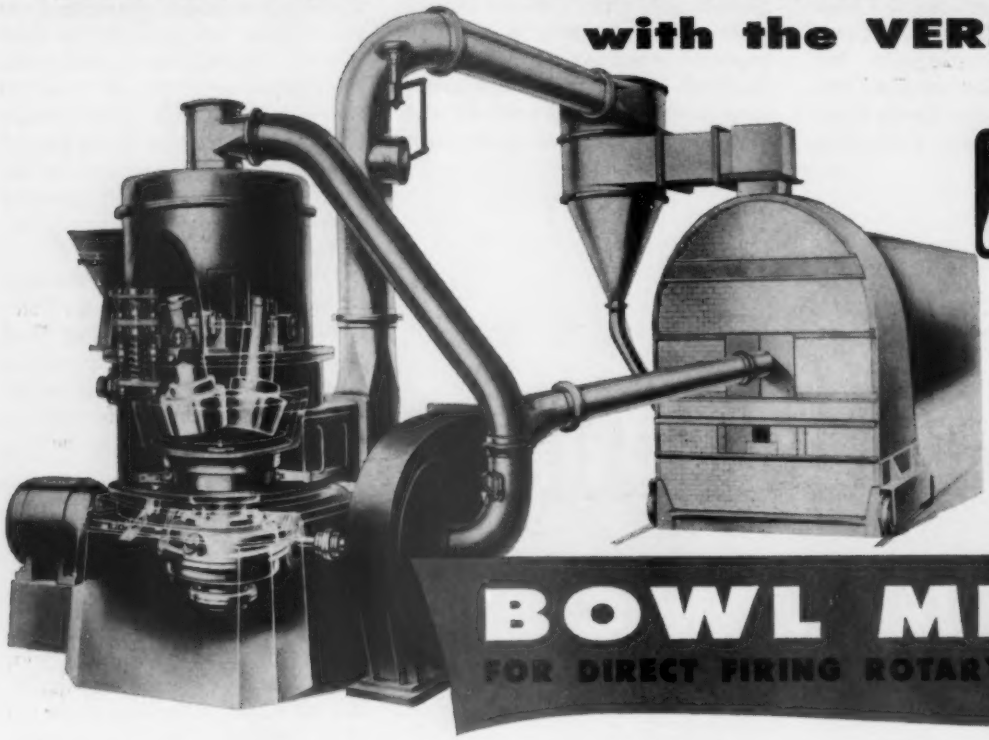

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FOR DIRECT FIRING ROTARY KILNS

After more than 25 years of top-level performance in the cement industry, these modern Bowl Mills still lead the field in pulverizing economy and kiln burning efficiency. Because of time-proven advantages, more and more operators of cement, lime and dolomite kilns are equipping their new plants with Bowl Mills . . . or converting their old plants to Bowl Mill installations.

The principle of incorporating a revolving bowl and stationary grinding rolls, with no metal-to-metal contact, provides wide range capacity at continuous 24 hour, noiseless, vibrationless operation. Availability is almost 100 per cent.

Write for Bowl Mill Catalog Number 92 Q.

RAYMOND MECHANICAL AIR SEPARATOR

This unit, available in nine commercial sizes, is equipped with a patented revolving Whizzer, single or double type, and offers three general types of application.

A. In closed circuit with a grinding unit for increasing fineness and mill capacity.
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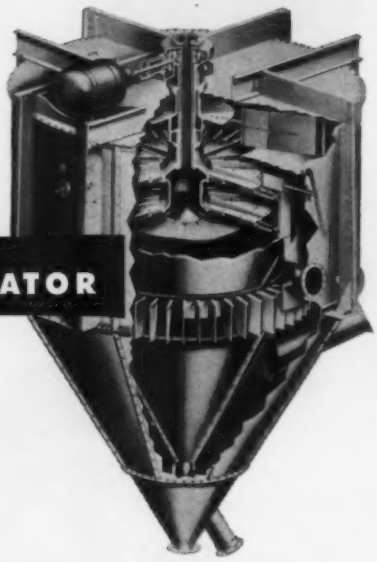
An internal air distribution system for handling special materials, which require cooling or drying may be provided. Additional liners are furnished for classifying abrasive materials.

Write for Raymond Mechanical Air Separator Catalog Number 90 Q.



Double Whizzer Separator showing air openings.

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Aerial tramway moves a million tons of ore every year

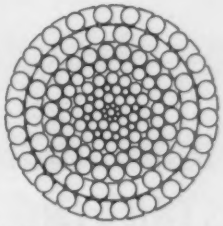
2½-ton capacity ore cars ride smoothly on Bethlehem track strand

In a rugged section of Oregon's Coast Range, The Hanna Mining Company works the only nickel mine now operating in the United States. On top of Nickel Mountain the ore body lies right on the surface; the open-cut mining method is used.

It's 8,300 ft from the loading terminal at the upper level to the smelter stockpile at the foot of the mountain and there's a drop of some 2,000 ft in elevation. A continuous aerial tramway was selected as the most economical way to move the crushed ore downhill over this difficult terrain. The tramway is equipped with 63 ore cars which carry 2½ tons each. Rated capacity is 250 tons per hour, feeding over a million tons a year to the smelter.

50,000 ft of large track strand and wire rope used

Unlike a monocable aerial tramway, the ore cars ride on *two* pairs of Bethlehem track ropes. The upper pair is 2-in. diameter strand, while the lower is 1½-in. diameter locked-coil track strand. This type of track strand has a smooth surface for the carriage wheels, holding vibration to a minimum as the tram car runs over it. It is designed to resist bending and crushing stresses, too, and takes abrasion remarkably well. Altogether, 16,920 ft of each size strand is involved, as well as 16,640 ft of 2-in. diameter Bethlehem Purple Strand wire rope for haulage lines.



Half-locked coil strand is designed to be flexible, yet strong. The 2-in.-diam strand has a minimum breaking strength of 218 tons.

If you would like to know more about wire rope for aerial tramways, simply get in touch with the nearest Bethlehem sales office. They'll be glad to give you full details.

Steel *for Strength . . . Economy . . . Versatility*

There's a distributor of Bethlehem Rope near you, supplied by our nationwide network of wire rope mill depots.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
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BETHLEHEM STEEL

BETHLEHEM STEEL — BETHLEHEM WIRE ROPE

public sidewalk located off its premises. In rejecting that contention, the higher court said:

"We think the line of division is drawn too narrowly and closely when circumstances of place are thus considered to the exclusion of all others. The quarrel outside of the plant was merely a continuation or extension of the quarrel begun within. The rule is well settled that an employee, even after closing time, is in the course of employment until a suitable opportunity has been given to leave the place of work."

Can't Specify Carrier

Considerable discussion has arisen from time to time over the legal question: If a manufacturer insists on specifying a transportation company or carrier to transport its products, does the manufacturer violate anti-trust laws?

For example, in *Long* v. *Arizona Portland Cement Company*, 362 Pac. (2d) 741, a contractor named Long sued the Arizona Portland Cement Company alleging that the cement manufacturer refused to sell him cement except on condition that he use a common carrier specified by the cement company. In fact Long proved that he possessed a motor truck licensed for the transportation of cement but that the cement company refused to permit the transportation of purchased cement on his truck. Long alleged that this was illegal conspiracy resulting in damage to him, forcing him to pay more freight charges than he would have had to pay had he been permitted to use his own or hired trucks.

It is important to note that this higher court held that these allegations stated a valid claim under the Arizona anti-trust laws. In a subsequent issue I shall go further into details as to just what later courts may ~~rule,~~ on this subject of law.

Law of Credit Cards

Recently the writer attended a convention of non-metallic products manufacturers and sellers, and two or three members brought up this legal question: "Just what are the liabilities of the holders of credit cards to pay for materials purchased by one who obtains the card through fraud?"

Quite recently a higher court went into considerable detail on this subject of law. Briefly this higher court held that the owner and holder of a credit card is liable for payment for materials purchased by one who obtained the card without proper authorization if such holder fails to promptly notify the company that issued the card, that the card has been lost, stolen, or otherwise not accounted for.

For example, in *Union* v. *Lull*, 349 Pac. (2d) 243, the testimony showed that one Lull had been issued a credit card which he had used for a long period. This card had printed thereon the usual clause that Lull would pay for all materials and merchandise delivered to or purchased by any unauthorized holder of the card, until such time as the company that issued the card received from Lull a notification that the card was not in his possession.

The facts are that one Wills, without knowledge of Lull, obtained possession of the card, and proceeded to use it to purchase $1,450 worth of merchandise. Finally when Lull received a bill for this merchandise he informed the company that he did not know that the card was in possession of Wills, and in fact did not know that it had left his own possession.

Lull refused to pay the bill and the company filed suit against Lull. During the trial Lull testified that he was an innocent holder of the card, and without any knowledge that it had been possessed by Wills. Hence, Lull argued that the company which issued the card should be responsible for purchases made by Wills. It is interesting to note that the higher court held that Lull must pay the full amount of the $1,450 bill, and explained that Lull was fully liable on the clause printed in small type on the card that the holder would pay for merchandise purchased by anyone holding or presenting the card, until the company received notification from Lull

(*Concluded on page* 153)

a SCHAFFER POIDOMETER can be YOUR EFFICIENCY EXPERT with OUTSTANDING OPERATING ECONOMY

OVER **1600** SERVING BULK MATERIALS PLANTS

★

WRITE FOR COMPLETE DETAILS AND CATALOG NO. 5

Simple to operate—set the remote control devices and the Schaffer Poidometers will WEIGH—BLEND—FEED—MIX—RECORD and PROPORTION with the greatest accuracy.

It's automatic in operation—it's a smooth operating machine and assures efficiency at high-speeds.

Schaffer Poidometer Co.
2828 Smallman St. Pittsburgh 22, Pa.

Enter 146 on card, page 149

What's new about this shovel?

As a pure statement of fact, there's *nothing* about this shovel that *isn't* new. *No part* of an AMERICAN is a carry-over . . . a warm-over . . . or a beefed-up version of a "yesterday's" machine. You see it in AMERICAN's modern simplicity. Its well-planned machinery deck. Its overall balance and coordinated design.

AMERICAN gives you smooth-running anti-friction bearings at all vital points. Outboard bearings for more rigid shaft support. Big, cool-running clutches. Independent shaft assemblies. The huskiest travel machinery per size-class of any shovel on today's market.

If you have felt that all shovels are pretty much alike, we have a notion that a close look at an AMERICAN will change your mind. S-755

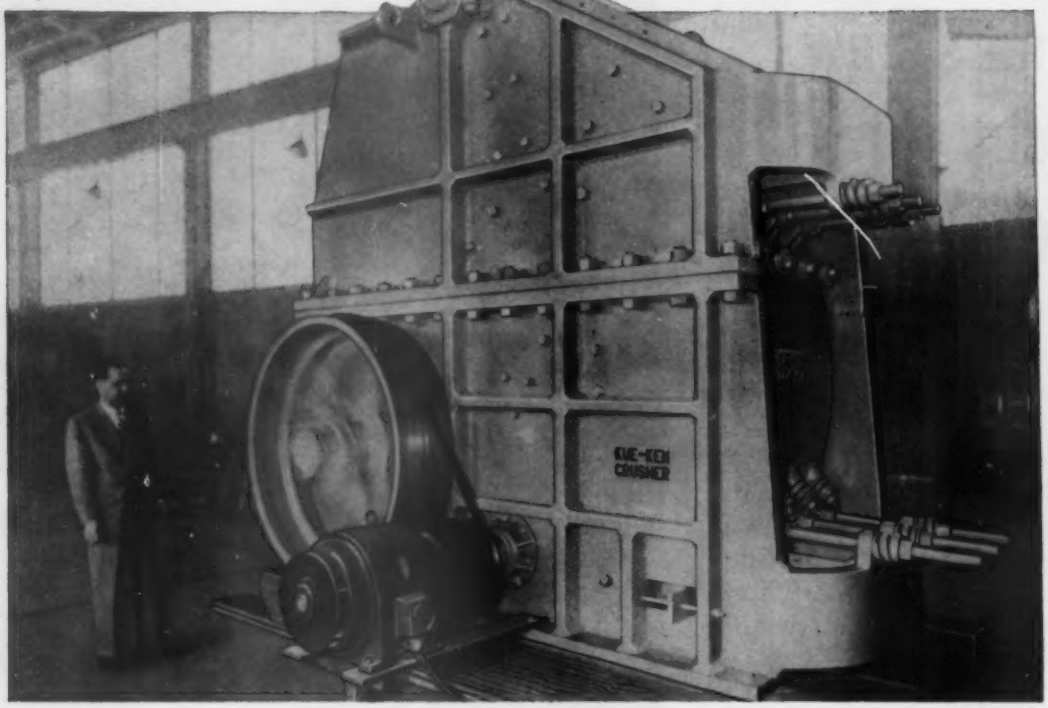
AMERICAN

AMERICAN HOIST and DERRICK COMPANY
ST. PAUL 7, MINNESOTA

SHOVELS ½ TO 4½ YDS
CLAMSHELLS—DRAGLINES

FORGED FITTINGS FOR WIRE ROPE AND CHAIN
(Crosby-Laughlin Division)

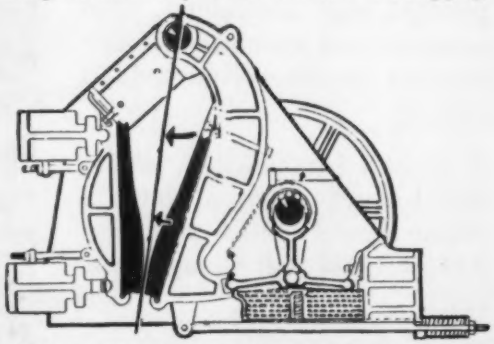
KUE-KEN® crusher starts on smaller motor . . . operates on less horsepower



A low cost normal duty squirrel cage motor provides ample power for starting and operating a Kue-Ken crusher on toughest rock. Every Kue-Ken crusher from the 12″ x 7″ to the 48″ x 60″ size is specially designed to give you from 1½ to 3 times more crushed rock per horsepower. No power is wasted lifting heavy reciprocating parts: the Kue-Ken crushing jaw swings as a pendulum from a stationary hinge pin. No power is wasted wearing out jaw plates: Kue-Ken jaw swings in an almost straight line to crush rock squarely without the conventional up-down rubbing motion. No power is lost from dirt clogging: Kue-Ken precision machined toggle mechanism operates in a sealed, filtered oil bath to reduce wear and friction to an absolute minimum.

The efficiency of Kue-Ken crushing is shown in the shop test of the above 48″ x 42″ model. Operating at 275 rpm, only 17 hp is required to run empty. A single vee belt and a 30 hp normal duty squirrel cage motor starts crusher with ease. Note also that crusher is not fastened to floor.

Kue-Ken runs at greater speed for higher capacity and a more uniform product. It provides positive protection against damage by tramp iron. An automatic, adjustable safety release integral with the flywheel ends shearing or breaking parts caused by tramp iron. In 33 sizes, Kue-Ken Crusher crushes more rock with less power for lowest cost-per-ton crushing.



Kue-Ken pendulum type jaw swings in an almost straight line to crush rock squarely without rubbing. Saves power, lengthens jaw plate life at least 5 times. Maximum leverage is where it counts most . . . at the top of the jaw for crushing large rocks.

KUE-KEN® CRUSHERS

"CRUSHING without Rubbing"

STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor, Close Works, Gateshead-upon-Tyne 8, England

DEALERS:
SEATTLE, WASH., Washington Machinery Co. • VANCOUVER, B. C., Universal Equipment Co. • SALT LAKE CITY, UTAH, Lund Machinery Co. • SAN ANTONIO, TEX., Closner Equipment Co. • LOS ANGELES, CALIF., Garlinghouse, Freman Co. • SAN FRANCISCO, CALIF., Aggregate Engineers, Inc. • PORTLAND, OREGON, Air-Mac, Inc., of Oregon • BISMARCK, NORTH DAKOTA, Midwest Equipment Co.

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

BINDER SYSTEM horizontal vibratory screen is described in the new 2-page Specification Sheet B-10 issued by *Comco Corporation.* The sheet includes dimension drawings and a photo of the screen showing its balanced-mass design. **(301)**

PORTABLE SEISMIC TIMER, Model R-117, is detailed in a data sheet issued by *Soiltest, Inc.* Model R-117 can be used to measure depth to shale, rock, etc., as far down as 100 ft. below surface, utilizing seismic shock waves generated by sledge blows or by seismic caps. The apparatus can be operated without previous knowledge of seismology. **(302)**

WINTER EQUIPMENT is covered in a 6-page bulletin (WE-1) issued by *Aeroil Products Co., Inc.* Details on space heaters, steam thawers, thawing torches, etc., are given; a table on how to figure heater requirements for any given cu. ft. area is also included. **(303)**

PIT-MAN series of equipment for gravel crushing and screening plants are described and illustrated in Bulletin No. BR-35-10A issued by *Gruendler Crusher & Pulverizer Co.* Specifications are given for five models of portable plants as well as descriptions of optional equipment. **(304)**

"FACTS ABOUT MANGANESE STEEL CASTINGS" is a 16-page booklet issued by *American Manganese Steel Div.* of American Brake Shoe Co. It explains how Amsco builds impact and abrasion resistance into parts for shovels, draglines, crushers, etc. **(305)**

"ADJUSTABLE-SPEED DRIVES" is a 32-page, illustrated bulletin (No.

FIRST CLASS
PERMIT NO. 44
CHICAGO, ILL.

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

—POSTAGE WILL BE PAID BY—

Pit and Quarry Publications
431 South Dearborn Street
CHICAGO 5, ILL., U. S. A.

DECEMBER **PIT AND QUARRY** **1961**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

Void after 60 days.

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Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

We produce _____

DECEMBER **PIT AND QUARRY** **1961**

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Void after 60 days.

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Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

We produce _____

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

NEW SUBSCRIPTION ORDER FORM

Send PIT AND QUARRY to me for

____One Year $3* ____Two Years $5 ____Three Years $6

____Payment enclosed ____Bill me ____Bill company

Name _____ Title_____

Company _____

Address _____

City _____ Zone_____ State_____

Type of business
and products _____

*U. S., U. S. Possessions, and Canada only.
Pan American countries, $10 a year; elsewhere, $15 a year.

FIRST CLASS
PERMIT NO. 153
ST. JOSEPH, MICH.

BUSINESS REPLY CARD
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215 Wayne Street
ST. JOSEPH, MICHIGAN

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Pit and Quarry Publications
215 Wayne Street
ST. JOSEPH, MICHIGAN

GEA-6999) issued recently by *General Electric Company*. Besides defining drives and their role in industry, the bulletin deals with product description and application, factors in drive selection, and examples of and recommendations for special applications. It also points out ways to apply drives to increase quality and production. **(306)**

THE THEORY OF OPERATION of Lorig Aligner Type II Self-Centering Rolls is described and illustrated in an 11-page brochure issued by *U.S. Steel Corporation*. The rolls are particularly beneficial when used as idler rolls, pulleys in conveyors and other belted systems. **(307)**

ABRASIVE WEAR is explained in a 4-page bulletin recently issued by *Esco Corporation*. Since the problem of abrasion is met constantly in the mining industries, the bulletin may prove helpful in selecting proper steels. **(308)**

"INDUSTRIAL GAS DATA", a 48-page pocket-sized booklet available from *Air Reduction Sales Company*, lists physical and chemical properties of gases. Conversion tables provide a simple method for changing volumetric information from one unit of measure to another. The booklet also gives capacity data on industrial gas delivery and storage systems. **(309)**

PUMP FUNDAMENTALS, a 16-page booklet available from *Goulds Pumps, Inc.*, gives an elementary outline of the characteristics, operation and selection of reciprocating, rotary and centrifugal pumps. Nontechnical, this booklet is of primary interest to those who desire a basic knowledge of pumps. **(310)**

Enter 151 on card, page 149 →

Some 20 miles away from the airfield, Celli's TECs are loaded in a jiffy — by hoppers or front-end loaders. Each makes 5 or 6 trips a day.

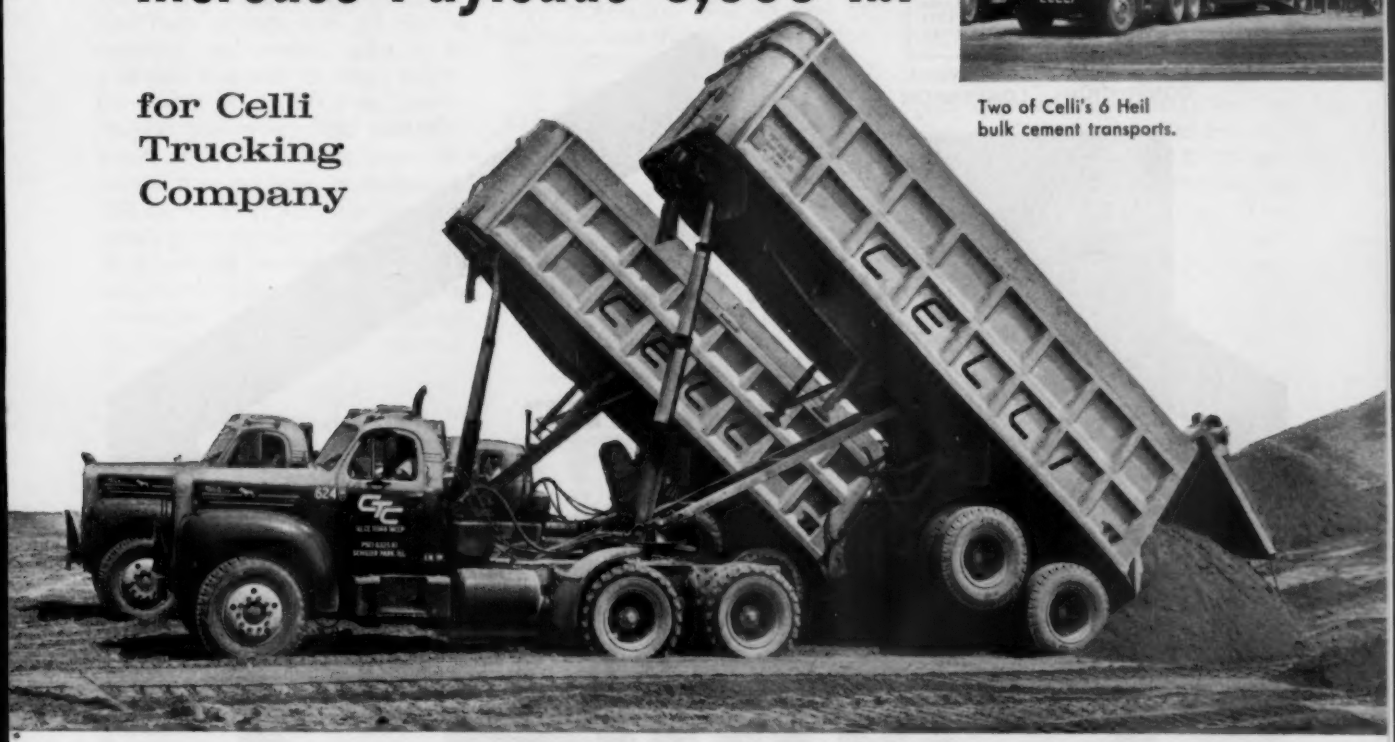
Aluminum HEIL-TEC Dump Trailers *Increase Payloads 5,000 lb.*

for Celli Trucking Company

Celli Big User of HEIL Equipment

All told, Celli has 27 aluminum and 16 steel HY-TEC trailers; 6 Heil bulk cement transports; 4 Heil petroleum transports and 23 Heil dump bodies.

Two of Celli's 6 Heil bulk cement transports.



"High-flying" TEC trailers help maintain stockpiles of sand and gravel for expansion of airfield. Two of Celli's aluminum trailers dump sand here in double-quick time.

The live-wire Celli Trucking Company, Schiller Park, Illinois, has boosted payloads of sand and gravel with fleets of both aluminum and steel HEIL HY-TEC frameless dump trailers.

"Our aluminum HY-TEC trailers give us about 5,000 lb more payload than the steel units we had several years ago," says Gene Celli. He has ten 30-yd and seventeen 26-yd units.

He also hauls several-thousand-pound bigger loads in his steel TEC units than in his previous conventional steel dump units — has four 30-yd and twelve 26-yd steel HY-TECs.

Mr. Celli praised the fine stability of a TEC with its twin-draft arms — permitting operation on rough terrain and holding the body firmly during dumping cycle, even while jackknifed.

Low maintenance, more hauling time, bigger payloads — these HY-TEC advantages will make your hauling more profitable, too.

The HEIL-TEC distributor in your area will be glad to discuss your needs — every TEC unit is engineered for the kind of applications you specify and for the area where it will operate.

TEC Division

THE HEIL CO.

DUMP BODIES and HOISTS

TEC Division, 1285 West 70th Street, Cleveland 2, Ohio

Open to all Producers and Users of Sand, Gravel and Ready Mixed Concrete

NATIONAL READY MIXED CONCRETE ASSOCIATION — NRMCA
32nd ANNUAL CONVENTION

NSGA NATIONAL SAND AND GRAVEL ASSOCIATION
46th ANNUAL CONVENTION

NOW
UNDER ONE ROOF

COMBINED

Biennial Show

Magnificent new McCormick Place Exposition Center
CHICAGO · FEBRUARY 5-8, 1962

FREE registration and admission to users as well as producers of sand, gravel and ready mixed concrete.

- **ACRES OF NEW IDEAS.** More than 160 blue ribbon exhibitors. New equipment. New methods. New ideas. All to help you cut costs . . . increase efficiency and profits.
- **FREE TIME TO SEE SHOW.** No convention meetings all day Monday . . . or Tuesday and Wednesday afternoons. Plenty of time to see all exhibits, exchange ideas, talk with friends and business associates.
- **FREE, FAST TRANSPORTATION** between Conrad Hilton and McCormick Place. Buses scheduled every 3 minutes during rush hours. Every 10 minutes throughout each day.
- **EXCELLENT DINING FACILITIES.** No need to hunt for a place to eat. McCormick Place has three restaurants and one cafeteria. Large, modern. Prompt service, excellent food.

PLAN NOW TO SEE THIS GREAT COMBINED INDUSTRIES SHOW

Legal Decisions

(*Concluded from page* 146)

to cancel the card, or that it was in the hands of an unauthorized person.

Taxes Payable on Amount Received

A few weeks ago a higher court held that under all circumstances a taxpayer is obligated to pay federal income taxes based on the amount of money directly received.

See *C. C. R. Company* v. *United States,* 276 Fed. Rep. (2d) 211. The facts of this case are that a company sold certain materials to a retailer who sold the materials to his customers. In filing its federal income tax return the company listed as income the amount the retailer received from its customers. The higher court held that the company's gross income, for the purpose of computing percentage of depletion, was the amount it received from the retailer, rather than the amount the retailer received from its customers.

Law of Zoning

A few weeks ago the operator of a concrete mixing plant asked whether or not a city can pass a valid ordinance which restricts the rights of a company now in operation. The answer to this question is in the affirmative if the testimony proves that present operations of the plant are detrimental to the health, morals, or general welfare of the public. Also, a recent higher court held that although a plant has been in operation for many years, a zoning ordinance is valid and enforceable which gives the company a long period, such as 20 years, to operate its plant before conforming with the requirements of the new ordinance.

See *Livingston Rock and Gravel Company* v. *County,* 272 Pac. (2d) 4. In this case it was shown that a county adopted a new ordinance stopping a company from operating its new batching plants, recently constructed for the loading of ready-mix concrete mixer trucks with concrete aggregates. This was so although this company had expended a large amount of money in constructing its new additions and in purchase of new mixer trucks.

After due consideration the higher court held that what is known as "automatic exception" was applicable whereby it is lawful to enforce the new ordinance but that 20 years' time would be given the company before the new ordinance was effectively put into force to give the company an opportunity to earn a sufficient amount of profit to salvage its investment.

Sales and earnings figures for Ideal Cement Company for the first nine months of 1961 showed an increase over the same period last year—$93,240,027 sales, $12,447,872 net income, compared with $85,939,626 sales and $11,254,792 net in 1960.

The 1961 edition of *Business Statistics,* a biennial book published by the Office of Business Economics, U. S. Department of Commerce, is now on sale at $2 a copy. Copies may be obtained from any of the 33 Department of Commerce field offices, or by writing to the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

For the 17th consecutive year Marquette Cement Manufacturing Company won the Oscar-of-Industry trophy for excellence in annual reporting. An independent board of judges in the *Financial World's* annual report survey of the cement industry presented the award.

General Portland Cement Company reported net earnings for the nine months ended September 30, 1961, of $6,707,100 or $1.25 per share, compared with $7,996,400 or $1.49 per share a year ago. The drop was attributed partly to curtailed production in Southern plants, due to hurricane Carla.

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants

OPEN CHAIN LUBRICANT INCREASES CHAIN LIFE UP TO 300%

Penetrates, lubricates, prevents rust. Lubricates deep into chain linkage to reduce friction on pins, rollers, bushings, pressure surfaces. Corrosion inhibitor prevents rust in vital working mechanisms. Lubricates close-tolerance internal surfaces to increase chain life up to 300%. Highly recommended for all climatic conditions to stop rust and corrosion even in salt atmospheres.

Packaged in handy 16 oz. aerosol spray-on containers or in bulk—send for a free trial sample.

ANTI-FRICTION COMPOSITIONS HAVE NO MELTING OR DROPPING POINT

Packaged in 14½ oz. cartridges for handy application with lever-type cartridge guns for constant protection to roller, ball, sleeve bearings and sliding surfaces in "hot" bearing applications or in areas with high ambient heat. Exclusive formulas have no melting or dropping point; moisture resistant; will not wash out; exceptional metal adherence properties; temperature reducing qualities; high extreme pressure values. Available in two grades. Whitmore's Anti-Friction Composition No. 1 (light density), recommended for high speed, high temperature applications. Anti-Friction Composition No. 2 (heavy density), for low-speed high-temperature applications or loosely-fitted bearings. Specify No. when requesting free trial sample.

68 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Open and Enclosed Chain
- Speed Reducers
- Enclosed Gear Cases
- Roller, Ball and Sleeve Bearings
- Wire Rope and Cable
- Hydraulic Units, Torque Converters

Est. 1893

THE WHITMORE MANUFACTURING CO.

LUBRICATING ENGINEERS

CLEVELAND 4, OHIO • VULCAN 3-7272

Enter 153 on card, page 149

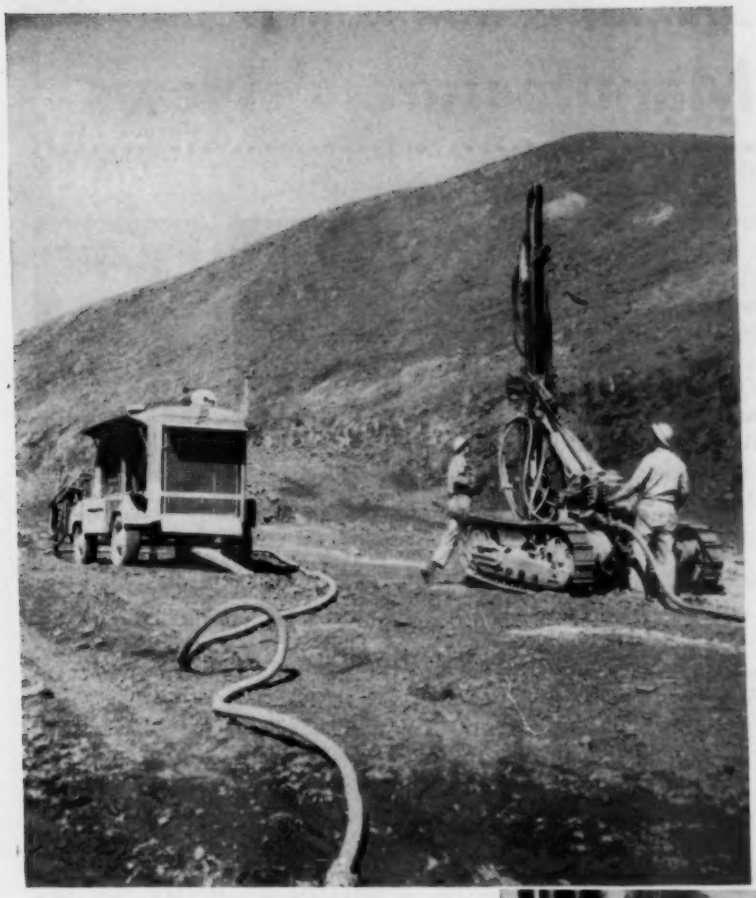
RAY-MAN CONVEYOR BELTS
On Giant Wheel Excavators
Move Overburden More Than 400 Feet ...At 5100 Tons Per Hour!

High-speed belt conveyors, with huge carrying capacities, are an integral part of this new 1,600 ton wheel excavator built for Peabody Coal Company at Bucyrus-Erie Company. High conveyor speeds—over 1,000 FPM—and high impact, put a tremendous strain on belt and belt splice. Ordinary belts can't take it. Ray-Man Conveyor Belting met the production standards of Peabody's giant earthmover—to handle *full* loads of overburden at *full* speeds *without* costly downtime for splice repairs!

Ray-Man belts on other machines of this type have hauled over 12,000,000 tons—outperforming all competitive belts. Splices last twice as long because double ply compensation relieves outer ply stress at bends. Ray-Man trains naturally, resists impact and ripping, requires no breaker ply. Exclusive XDC cover prolongs belt life. Let an R/M distributor show you how an R/M Conveyor Belt can outperform other belts on *your* conveyors. Write for Bulletin M302 and Catalog 25CB.

OVER 900 FT. OF 54" RAY-MAN CONVEYOR BELT are required for digging ladder and stacker conveyors on this huge Bucyrus-Erie Wheel Excavator. Machine will help increase output a million tons annually at Peabody Coal Company's River King Mine near Freeburg, Illinois.

RAYBESTOS-MANHATTAN, INC.
MANHATTAN RUBBER DIVISION • PASSAIC, N. J.
ENGINEERED RUBBER PRODUCTS



HOMOFLEX HOSE
Weighs Less Than Any Other Hose For Equal Pressure

It's flexible as a rope, too . . . the easiest handling air hose you can use. Homoflex has no pre-set twist . . . coils and uncoils in *any* direction *without* kinking. Strength member and tube are virtually inseparable. Uniform inside and outside diameters make it easier, *safer* to couple.

- **Super-Strong** — assures longer, trouble-free service life
- **Precision Built** — with super-strength, low-stretch cords
- **Mandrel-Made** — no pre-set twist
- **Kinkless** — coils and uncoils freely in any direction
- **Homogeneous Construction** — provides inseparable tube-to-cover bond
- **Safer, Easier To Couple** — inside and outside diameters are uniform

Ask about rugged Homoflex and other types of R/M hose for your applications. Write for Bulletins M620 and M694.

R/M POLY-V® DRIVE
More Power in Less Space ...With More Reliability

A single, endless V-ribbed belt across full width of sheaves with mating grooves. Gives more power per inch of width and advantages never possible with conventional multiple belt drives.

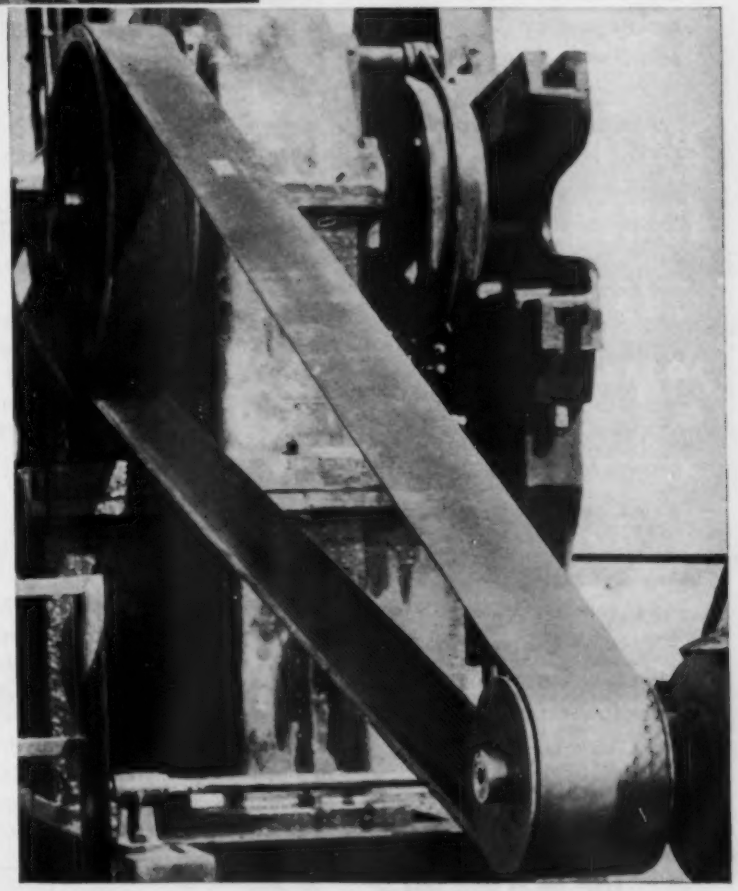
- **Simplicity** — *two* belt cross sections meet *every* heavy duty requirement
- **Reliability** — less maintenance, less take-ups . . . longer belt and sheave life
- **No Matching** — single unit belt eliminates "length matching"
- **Better Performance** — maintains groove shape, constant pitch and speed ratios . . . runs smoother, cooler

WHEN YOU CHANGE DRIVES CONVERT TO POLY-V*... AND BE SURE.

Write for Bulletin M141.

*patented

RM113R



IT'S A FACT*

Longyear offers the fastest, easiest-to-use Diamond Bit Order Service in the world. New manual with Bit "Selector-Chart" makes your bit selection and ordering instantaneous. And you are assured of a superior bit for your job on every order . . . with no complicated design or cost calculations. Contact our nearest office for your free copy of the Longyear Diamond Bits Manual.

E. J. LONGYEAR CO.
MINNEAPOLIS, MINNESOTA

Longyear

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Salt Lake City, Utah
CANADIAN LONGYEAR LTD.
North Bay, Ontario, Canada
LONGYEAR DE MEXICO S. A. de C. V.
San Bartolo, Mexico
NIPPON LONGYEAR COMPANY LTD.
Tokyo, Japan
LONGYEAR N. V.
The Hague, Holland
LONGYEAR ET CIE
Paris, France
CHRISTENSEN LONGYEAR (INDIA) LTD.
Bombay, India

Enter 156 on card, page 149

Manufacturers' News

The 28th annual meeting of the Paper Shipping Sack Manufacturers' Association, Inc. was held recently at The Greenbrier, White Sulphur Springs, W. Va. BERNARD W. RECKNAGEL, vice-president, St. Regis Paper Co., was elected president and F. GREGG BEMIS, chairman, Bemis Bro. Bag Co., was elected vice-president of the association.

The board of directors elected were: F. G. Bemis, Bemis Bro. Bag Co.; T. W. Brown Jr., Owens-Illinois; J. R. Clements, Raymond Bag Corp., Div. of Albemarle Paper Mfg. Co.; H. Holden, Kraft Bag Div. of St. Marys Kraft Corp.; W. L. Jennings, West Virginia Pulp & Paper Co.; E. K. Ludington Jr., Chase Bag Co.; G. D. Morgan Jr., Seaboard Bag Corp.; H. M. Recher, Union Bag-Camp Paper Corp.; B. W. Recknagel, St. Regis Paper Co.; A. A. Scholl, International Paper Co., Bagpak Div.

FRANK POCTA was re-elected executive secretary & treasurer.

LEONARD J. LINDE has been appointed director of engineering, Industries Group, Allis-Chalmers Manufacturing Company. He had been director of engineering services since August, 1960.

Mr. Linde joined Allis-Chalmers in 1950 serving as assistant general manager and chief engineer of the Boston works. He has been responsible for many developments, particularly in oilless power circuit breakers, and holds patents in the switchgear and allied fields.

E. ROBERT CARPENTER has been appointed to the position of general sales manager, the Hydreco Division of the New York Air Brake Company.

Mr. Carpenter has served Hydreco in a number of engineering and sales assignments since joining the company in 1952. A recent assignment was as Mobile sales manager.

W. E. Bretschneider

W. C. Beaser

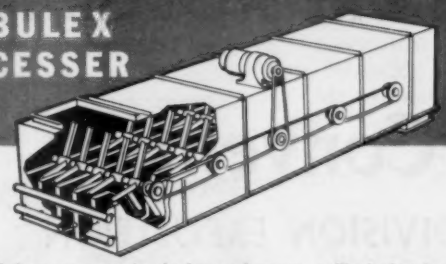
Two promotions in the sales and production departments of The Whitmore Manufacturing Company, Cleveland, Ohio, were recently announced. WILLIAM E. BRETSCHNEIDER, sales manager since 1957 and a member of the board of directors since 1959, has been appointed vice-president, sales. Prior to joining Whitmore in 1955 he was district representative of the J. T. Baker Chemical Company.

WILLIAM C. BEASER has advanced from works manager to vice-president, production. A member of the Whitmore board of directors since 1958, Mr. Beaser has a background of 28 years in the development and manufacturing of special lubricants.

EDWIN D. MEADE has been appointed director of commercial relations for United States Rubber Company. He joined the company as a mechanical goods salesman in 1935 and has held a variety of posts in field sales, commodity sales, sales to government agencies, to national industrial accounts, and in headquarters sales management. He will make his headquarters in New York.

JOHN J. BRADFIELD has been appointed to head the new Cleveland office of the Pennsylvania Crusher Division of Bath Iron Works Corporation, West Chester, Pa. The office will be located at 22360 Fairlawn Circle, Cleveland 26, Ohio, and will serve customers throughout most of Ohio and Michigan, as well as in the area of Erie, Pa.

Continuous hot or cold processing costs far less with the new TURBULEX PROCESSER



From calcining gypsum to drying polymers, a Turbulex by Western Precipitation is ideal for **continuous** hot or cold processing of free-flowing solids.

It's ECONOMICAL. Simple design makes it easy and inexpensive to fabricate, operate, maintain.

EFFICIENT. In calcining, thermal efficiency as much as **2½ times** the conventional kettle process — 78% vs 30%!

WIDE USE of the new Turbulex is possible wherever low cost, continuous, efficient processing is needed . . . in industries such as **food, non-metallic minerals, chemical, petrochemical** and **non-ferrous metallurgical.**

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Cocoa
Dry potato granules
Filter aid
Iron powder
Lime
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Sand
Sawdust
Silica flour
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Starch
Talc
Titanium dioxide
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45th Annual Convention

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Conrad Hilton Hotel — Chicago, Ill.

FEBRUARY 12-13-14, 1962

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1415 Elliot Place, N. W. **Washington 7, D. C.**

JAMES R. GRONSETH has been appointed manager of the hoist department, mining division, Nordberg Mfg. Co., Milwaukee, Wis. Formerly a mechanical engineer for Inland Steel Co., Mr. Gronseth also spent five years with Roland C. Buck, Inc., Engineers, a heavy construction company in Superior, Wis.

J. R. Gronseth

F. S. Burtch

FOREST S. BURTCH has been named general sales manager for John A. Roebling's Sons Division, the Colorado Fuel and Iron Corporation. He formerly was general product manager for the firm's construction materials division.

A. LESTER PATTERSON succeeded to Mr. Burtch's former position as general product manager for construction materials, and LLOYD E. HILL was promoted to product sales manager.

Mr. Burtch joined Roebling's wire rope engineering staff in 1923. Mr. Patterson joined Roebling's bridge division in 1940. Mr. Hill has been associated with Roebling since 1947, starting as a design engineer in the bridge division.

DR. CHARLES W. WALTON has been appointed vice-president in charge of research for Minnesota Mining & Manufacturing Co., St. Paul, Minn. He succeeds DR. CARL BARNES who recently resigned from 3M for personal reasons.

Dr. Walton, 53, was formerly vice-president and general manager of 3M's adhesives, coatings, and sealers division.

JOSEPH N. KEMPLE has been elected executive vice-president, marketing and operations, of Warner Company. He has also been elected to the board of directors, and to the executive committee.

PHILIP E. CUNNINGHAM has been appointed sales development manager for the Koehring Division of Koehring Company, Milwaukee, Wis. He will report to E. T. GOREE, vice-president in charge of sales for the Koehring Division.

Mr. Cunningham was product sales manager in charge of crane-excavators, including the Skooper, before his promotion.

CHARLES A. SENGSTOCK JR. has been named director of public relations for Cenco Instruments Corp. and its affiliated companies. Prior to joining Cenco, Mr. Sengstock was a public relations associate with Armour Research Foundation, Chicago, Ill.

A. CONANT MOULTON has been appointed director of public relations for Fairbanks, Morse & Co., Yonkers, N. Y. Mr. Moulton had been director, information services, for General Dynamics Corporation, New York, N. Y.

WAYNE L. DOWDEY, vice-president, sales for The Eimco Corporation is now headquartered at the head office of the corporation in Salt Lake City, Utah. He was formerly at Birmingham, Ala.

BERNE A. SCHEPMAN, vice-president of the Process Engineers Division of The Eimco Corporation, has moved from the divisional headquarters at San Mateo, Calif., to the Eimco head offices.

JOSEPH A. CONLON has been named vice-president, sales, for the Rubber Products Division of Dayco Corporation. He succeeds ROBERT G. BURSON, who resigned to accept another position.

The Rubber Products Division (formerly known as Dayton Industrial Products) maintains sales and general offices in Melrose Park, Ill.

Mr. Conlon joined Dayco to fill a newly created position of marketing manager of the Rubber Products Division. He began his career in 1933 as an industrial sales engineer with the United States Rubber Co.

MORE DROPS... MORE PROFITS

"CAPE ANALLOY STEEL DROP BALL IS ROUGH ON ROCKS"

Extra life and wearability are built into "CAPE ANN". FULLY Guaranteed and economical and Sonic Tested before shipment.

Outstanding Features:

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ANCHOR & FORGE CO. P. O. BOX 360 GLOUCESTER, MASS.

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CHARLES W. PARKER JR. has been named to the newly created position of general marketing manager, New Products Department, Allis-Chalmers Manufacturing Company. Along with the appointment announcement, the recently organized unit was renamed from Special Products to New Products.

Mr. Parker was director of sales promotion, Industries Group, since June, 1958. Prior to that he was manager of the company's Philadelphia, Pa. district sales office.

Two major promotions on the engineering staff of Marion Power Shovel Company were announced recently. JACK F. WEIS is now chief engineer of the firm's intermediate and large machine division. MARION F. COLE has been named chief engineer of Marion's small machine division.

Mr. Weis has been associated with the company since 1929; Mr. Cole since 1927. Both men have held various engineering positions with the company.

DONALD W. WAACK has been appointed manager of sales promotion at Bucyrus-Erie Co., South Milwaukee, Wis. He had been assistant sales development manager for Schield Bantam Co. and was associated with the Iowa firm for eight years.

He will be in charge of Bucyrus-Erie advertising, publicity, sales literature, photography, publications and sales aids reporting to sales services manager FRANK T. HOUSE.

DON W. MARTIN was appointed manager of sales development. He formerly was an account executive with Bert S. Gittins Advertising, Inc., Milwaukee, Wis. Prior to that Mr. Martin was a district sales representative for American Hoist & Derrick Co., and assistant advertising manager at Schield Bantam Co.

PATRICK L. MCMANUS has been appointed general manager of Worthington Corporation's Standard Pump Division at East Orange, N. J. He was formerly director of marketing services at the company's worldwide headquarters in Harrison, N. J.

ROBERT A. ANDERSON has been promoted to district sales manager at the Bensenville, Ill. office of Vickers Incorporated, Division of Sperry Rand Corporation. He will be responsible for mobile hydraulic equipment sales in the Chicago area.

Mr. Anderson has been in the Vickers mobile sales department since joining the firm in 1954, and prior to this appointment had been serving as application engineer in the Chicago area office.

R. A. Anderson

Jack Engle

The appointment of JACK ENGLE as sales promotion manager for Le Roi Division, Westinghouse Air Brake Co., was recently announced.

Formerly advertising manager for the South Bend Division of Curtiss-Wright Corp., Mr. Engle joined the sales promotion staff of LeTourneau-Westinghouse in 1960 as supervisor. He was also a salesman with an equipment distributor for three years.

CARMEN GUIDE JR. has been named manager of the New York office of Lake Shore, Inc., Iron Mountain, Mich. He was assistant sales manager of Welin Davit and Boat Division, Continental Copper and Steel Industries, Perth Amboy, N. J., at the time he joined Lake Shore.

HERBERT E. WEYRAUCH was named general manager of the Electronic Controls Division of Flo-Tronics, Inc., Minneapolis, Minn. He retains his former sales manager position in the Electronic Controls Division which designs and constructs automatic systems for material handling installations.

Mr. Weyrauch's work with transistorized and mechanical controls includes positions with Maico Electronics, Inc., and Dahlberg, Inc.

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with **WELD METAL**, re-machined & hard faced.

Another example of experienced Bethlehem service to the cement and rock products industries.

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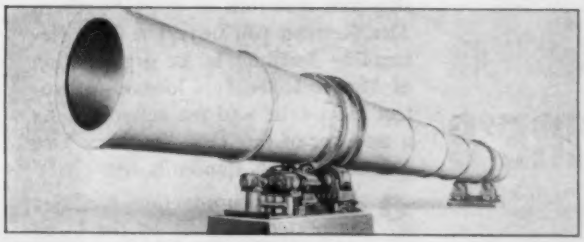

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VERTICAL LIME KILNS—CALCINERS—ELECTRIC HOISTS—24' GEARS

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GTE drills Minnesota metamorphosed limestone at 15' per hour.

Truck mounted 6TA drills blast holes for coal operations.

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BLAST HOLE DRILLS *by* PORTADRILL

Custom fitted to the job.

You can choose (or we will recommend) carrier; engine; mast height; kelly bar length; air volume and pressure; type and size of drill rod; dust control and/or dry sampling system.

All Portadrill designs feature mechanical drives; friction clutches; rotary compressors; hydraulically raised mast; full power break-out of drill rod connections; leveling jacks; hydraulically controlled feed or pull-down and variable rotating speeds.

Eight basic models for hole sizes 3½" to 9" and depths to 2,000 feet—customized to your specific drilling requirements.

105 on a blast hole contract in West Virginia.

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MFG. BY THE WINTER-WEISS CO.
2201 BLAKE ST., DENVER 5, COLORADO

BHD drilling overburden for a New Mexico copper mine.

6TA drilling blast holes on an Arizona mining location.

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RANOMATIC HARD SURFACING IN COILED WIRE

RANITE HARD SURFACING IN STICK ROD

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"the Tire Retreading Institute, of course," says Miss Southern Tire

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2. **guaranteeing all workmanship and materials against defects;**
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4. **maintaining uniformly high standards of production and material quality.**

Let Southern Tire service your retreading needs —all tread designs and latest equipment. We handle the following sizes: 26.5 x 29, 29.5 x 35, 3000 x 33, 33.5 x 39 and 37.5 x 33.

TIRE RETREADING INSTITUTE · QUALITY · MASTER RETREADER · GUARANTEE · WASHINGTON, D.C. · TRI

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ALFRED E. GRAZEN has been appointed president and general manager of Sterling Electric Motors, Inc., Los Angeles, Calif., a subsidiary of Hathaway Instruments, Inc., Denver, Colo.

Mr. Grazen was previously executive vice-president of Platecraft of America and partner in Emco Industries.

A. E. Grazen

T. D. Taylor

Cummins Engine Company, Inc., Columbus, Ind., has appointed THOMAS D. TAYLOR, formerly senior vice-president of Consolidated Freightways, Menlo Park, Calif., as its distributor for Oregon and Southwest Washington.

The new distributorship, with headquarters in Portland and branches in Eugene, Medford, North Bend and Pendleton, will be known as Cummins Oregon Diesel, Inc. The organization will operate the locations of the former distributorship, Cummins Diesel Sales of Oregon, headed by R. H. Wills.

Nagle Pumps, Incorporated, Chicago Heights, Ill., has announced the appointment of R. CASPER SWANEY, Box 215, Carlisle, Pa., to represent the firm throughout Pennsylvania.

The appointment of ROBERT H. WASZ as assistant vice president of Joseph T. Ryerson & Son, Inc., has been announced. Formerly general manager of the Ryerson plant in San Francisco, Mr. Wasz will headquarter in the firm's general office in Chicago. He will have the responsibility of administering the company's fabricating and manufacturing activities. Succeeding him as general manager at San Francisco is NORMAN F. REWOLDT who was manager of work order sales at this plant.

Constructors Equipment Company, Inc., Denver, Colo., has been appointed dealer for P&H construction and mining equipment manufactured by Harnischfeger Corporation, Milwaukee, Wis.

D. G. GIBSON is president of Constructors Equipment. Other management personnel at the new dealership includes R. L. CUTLER, service manager, and J. KEITH MOSER, parts manager. The address is 3611 Walnut St., Denver 5, Colo.

Mine and Smelter Supply Company, Denver, Colo., has opened a new branch office in San Jose, Calif., to serve the Pacific Coast area. ROY C. ENGSTROM was appointed head of the new office. For five years he has worked out of the company's Denver office as a metallurgical sales engineer.

The Gates Rubber Company has announced several new appointments. VICTOR E. LEHR, 10-year veteran with the company, has transferred from Quincy, Ill., to Buffalo, N. Y. His office is at 95 Henry St., Binghampton, N. Y.

KENNETH G. PETERSON has been appointed as district sales co-ordinator for the Omaha industrial sales district to work with distributors of Gates industrial products in Iowa and Nebraska. Industrial division district manager for the area is E. M. DAVIS.

ROLAND C. DALRYMPLE is now an industrial division field engineer with offices at 26th and Pennsylvania Ave., Pittsburgh, Pa. He was previously associated with Libbey-Owens-Ford Glass Co. in engineering sales.

WILLIAM E. JOHNSON is now an industrial division field engineer in San Francisco. Previously active in engineering sales work in the San Francisco Bay area, Mr. Johnson will serve the Oakland East Bay industrial community.

JOHN W. THORNTON has been elected vice-president and general manager of the Industrial Division of Joy Manufacturing Company, Pittsburgh, Pa. He formerly was vice-president, marketing.

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HANCO FLUX POWER SCREEN HEATERS

transmit power through the air!

With the all new Flux Power by Hanco all mechanical connections between transformer and screen are eliminated. The 0 to 4000 ampere current is transmitted through the air by inserting a conductor through the eye of the transformer. This permits unrestricted vibration, maximum power transmission and true screen balance.

5 YEAR GUARANTEE

★ Dust-tight, waterproof construction
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★ Use either plain or stainless cloth
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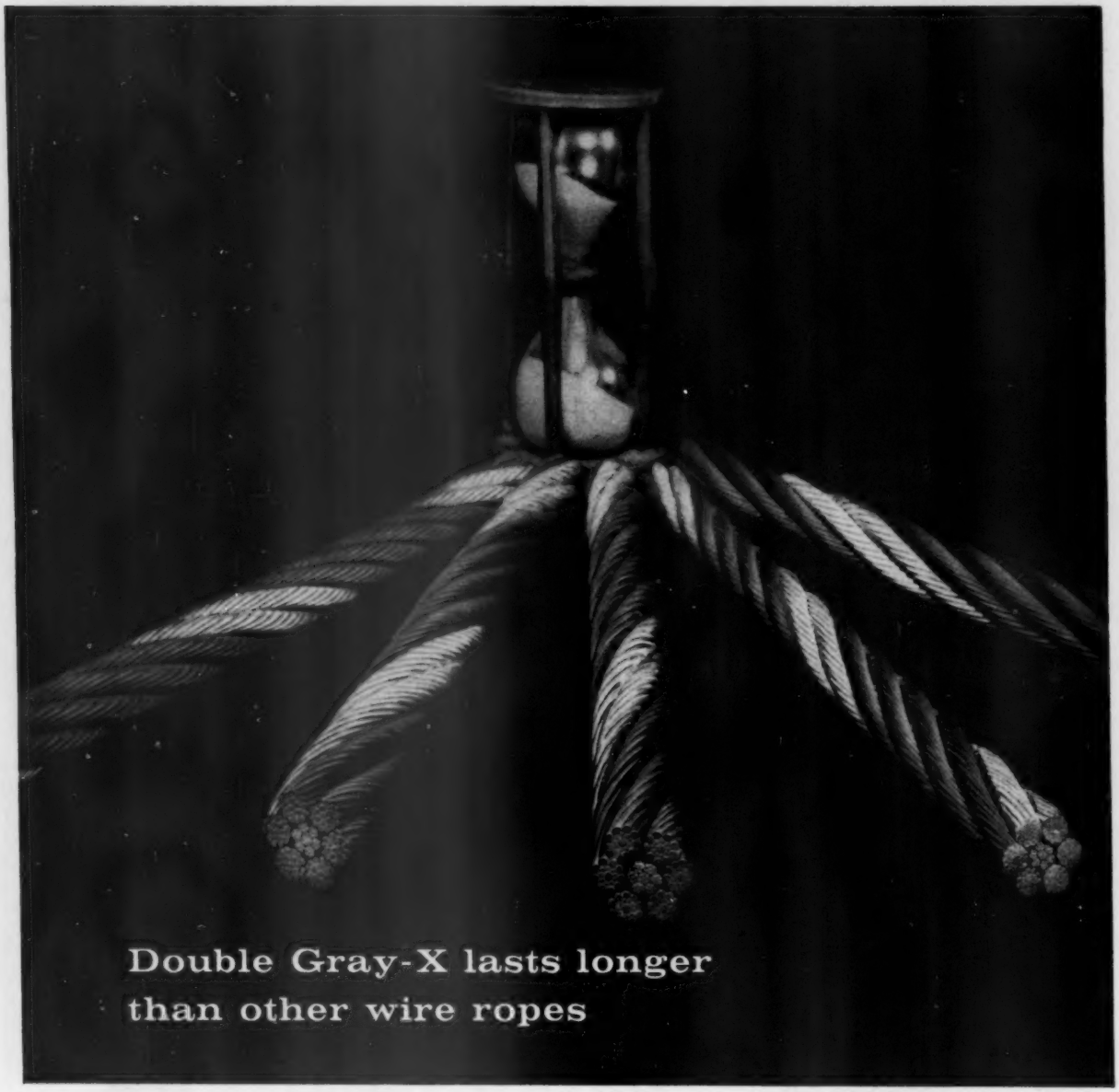
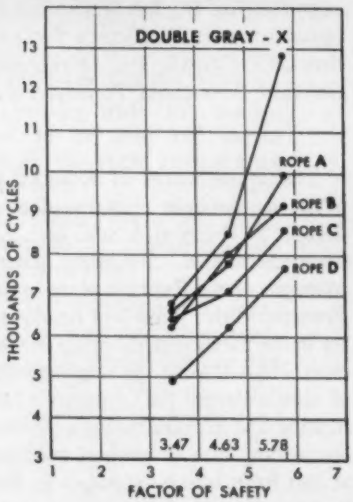


Double Gray-X lasts longer than other wire ropes

CF&I-Wickwire is making the wire rope of *tomorrow...today*. It's Double Gray-X —the rope with the molecular shield of molybdenum disulphide.

In an extended series of tests on a 25,000-lb. fatigue machine, CF&I-Wickwire's Double Gray-X outlasted four other major brands of high-strength rope at all three of the safety factors used. At the highest and most commonly-used safety factor, Double Gray-X had 45% more bending life than the average of other ropes tested. (Please see the chart at right.)

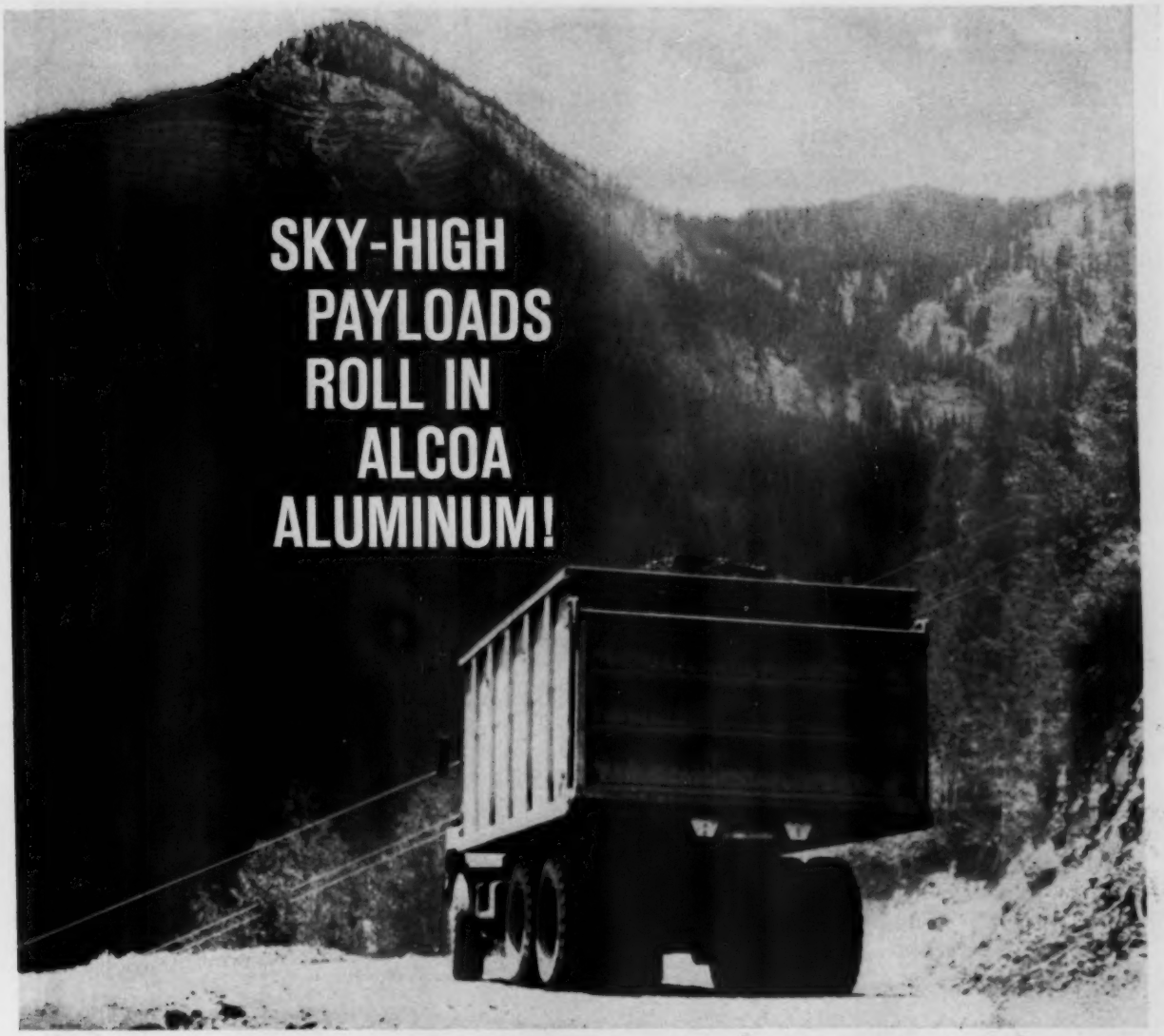
We'd like to give you some additional information on these tests . . . let you read some enthusiastic field reports from satisfied users . . . and show you how the molecular shield on Double Gray-X can help reduce your equipment-downtime costs. Contact your nearby CF&I sales office or distributor today.



All test ropes were ½" 6 x 25 FW Preformed E.I.P.S. Lang Lay IWRC.

THE COLORADO FUEL AND IRON CORPORATION
Denver • Oakland • New York
Sales Offices in Key Cities

CF&I STEEL MADE IN U.S.A.



Williamsen aluminum dump bodies do a tough job in the Rockies

Aluminum dump truck transfers coal at tipple (above) to hoistless aluminum dump trailers (below), emptied at the railhead by overhead equipment (right).

Descending 3,500 ft in just 5 miles, Williamsen off-highway aluminum dump trucks haul 66,000 lb of payload from a coal mine 10,000 ft high in the Rockies to a coal tipple. The dump bodies made of Alcoa® Aluminum make it possible for operator Morrison-Knudsen to save 1 trip in 10 over steel; cut 10 per cent off return time.

At the tipple, aluminum dump trailers are loaded with 35 cu yd and run to a railhead. Bodies for these frameless semitrailers weigh only 3,300 lb in aluminum.

Morrison-Knudsen figured costs to the last dollar for this operation involving the 14-unit fleet consisting of dump trucks and trailers; ordered aluminum bodies manufactured by Williamsen Body and Equipment Company, Ogden, Utah. They also know that the tough aluminum alloys in these bodies shrug off loading shocks—need little maintenance despite the corrosive sulfur compounds normally found in coal.

Free dump body folder tells how other operators boosted profits by switching to aluminum. For your copy, write: Aluminum Company of America, 1792-M Alcoa Bldg., Pittsburgh 19, Pa.

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9 billion dollars to build a better one.

We're living in a needing, buying, growing America—a time for new and improved products and services—the creation of new jobs. More than ever, a businessman with an idea, with the urge for something better will move ahead with our expanding economy.

But after the idea, what follows can be a costly period of research and development. Not necessarily—if you use the immense 9-billion-dollar fund of research and patent information that's available at your U.S. Department of Commerce. Think of the saving—in time and money.

For example: there are reports on extensive research by your Government in new products and processes. A translation of data on inventions and discoveries abroad—information on over 3 million patents—a fortune in patents owned by your Government. All this is yours—for your use and your benefit.

Take advantage of the many ways in which your business can grow. In developing new products and services. In the lucrative foreign markets. In new U.S. markets. In attracting new industry to your local community. Just phone or write the U.S. Department of Commerce Office of Field Services in your city, or Washington 25, D.C. Your U.S. Department of Commerce is always ready to help you grow with America!

NOW'S THE TIME TO GET GROWING IN A GROWING AMERICA!

Technical Engineering Company, Houston, Texas, has been appointed sales representative in east Texas and Louisiana for the Lehigh Fan and Blower Division of Fuller Company, Catasauqua, Pa., N. E. ZACHARIAH is president of Technical Engineering. Included in his previous experience was service with the Leland Hamner Company of Houston as chief engineer.

A. M. LOWREY was promoted to industrial distributor sales manager, Thermoid Division, H. K. Porter Company, Inc. He will continue as assistant industrial sales manager. Mr. Lowrey joined the Quaker Rubber Company in 1941 prior to its incorporation into H. K. Porter Company, Inc.

Todd Shipyards Corporation has announced the appointment of ROYCE C. CRAWFORD as manager of its industrial department. Located at the Corporation's New York City office, he will be responsible for the planning and co-ordination of increased industrial marketing activities in all of the corporation's plants.

Mr. Crawford was previously associated with the General Electric Company as manager, utility sales, St. Louis district.

The Lull Engineering Company, Inc., St. Paul, Minn., has recently announced the appointment of JOHN J. DORWIN as vice-president and general sales manager. Mr. Dorwin has joined Lull after 16 years with the Oliver Corporation where he has served in various capacities as service manager, chief engineer, and most recently as an O.E.M. sales representative.

Construction Supply & Rental Company, 21740 W. Eight Mile Rd., Southfield, Mich., has been appointed a distributor for eastern Michigan by the Kwik-Mix Company, Port Washington, Wis., manufacturer of mixing and material handling equipment.

Officers of the new distributor are HAROLD E. HICKEY, president, and ROD MCKUSICH, vice-president.

WILLIS F. GEIB, retired vice-president of the Mexico Refractories Company, died recently. He was 71 years of age.

One of the founders of the Mexico Refractories Company, which in 1959 was merged into Kaiser Refractories, Mr. Geib served for many years as a district sales manager in St. Louis. In 1939 he became vice-president of sales for Mex-R-Co and retired in 1948.

JOSEPH A. TRAINOR, for 42 years with the Taylor-Wharton Co., High Bridge, N. J., died recently at his home. Mr. Trainor began his association with the firm in 1913 as an apprentice in the sales department. In 1929 he was named assistant sales manager and was appointed sales manager in 1937. When he retired in 1955 he was a sales consultant.

Appointment of B. NEVLING CLUNE as vice-president and general manager of the Scale Division, Fairbanks, Morse and Company, was recently announced. He joined the company last year as assistant to the vice-president of operations and later became assistant general manager in charge of the Scale Division.

Mr. Clune announced appointment of three executives to new positions. HAROLD E. BOSLEY is now acting division sales manager; A. B. PARKER, product manager; and M. L. FROST, director of planning.

Mr. Bosley was formerly midwestern scale sales manager in Chicago; Mr. Parker was western district office manager, San Francisco, and Mr. Frost was director of management engineering in Royal McBee Corp., Port Chester, N. Y. All three will have headquarters in Fair Lawn, N. J.

BARRY R. BOYENS, a former partner of Wallace Asphalt Paving, has been named construction equipment district representative for the Peoria, Ill., branch of Oliver Corporation. Mr. Boyens will be Oliver's representative in Illinois, Indiana, and parts of Kentucky and Missouri.

Regardless of the vibrator you use . . . the payoff in high tonnage is in the screen section.

Cleveland wire screen sections are custom woven for accuracy of opening, ductility, minimum wear and maximum strength to deliver high tonnage and long screen life. They resist abrasion and fatigue and minimize equipment downtime.

Get maximum production and long life . . . call Cleveland for your next woven wire screen order.

THE CLEVELAND WIRE CLOTH AND MANUFACTURING COMPANY

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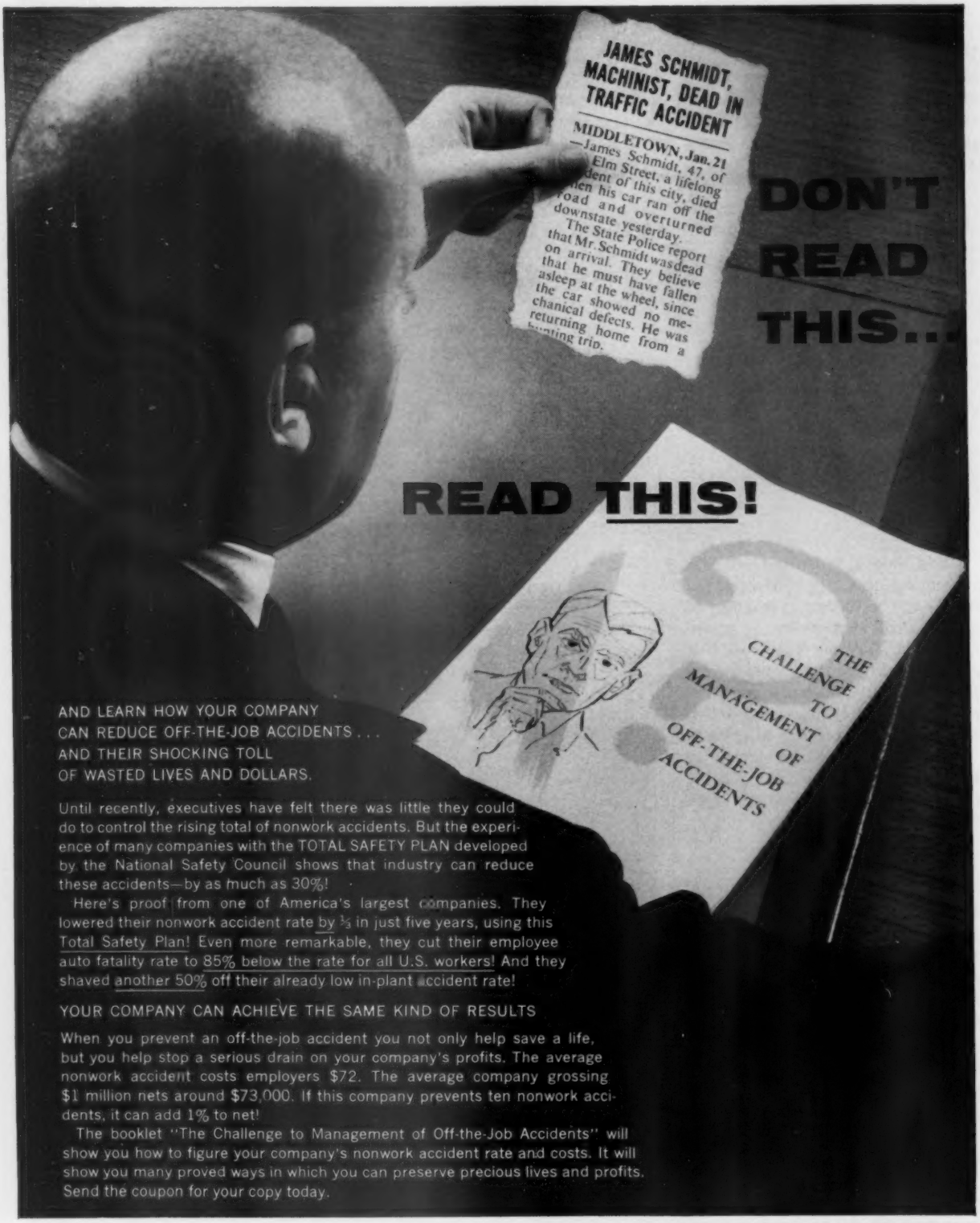
JAMES SCHMIDT, MACHINIST, DEAD IN TRAFFIC ACCIDENT
MIDDLETOWN, Jan. 21 —James Schmidt, 47, of Elm Street, a lifelong dent of this city, died hen his car ran off the oad and overturned downstate yesterday.
The State Police report that Mr. Schmidt was dead on arrival. They believe that he must have fallen asleep at the wheel, since the car showed no mechanical defects. He was returning home from a hunting trip.
DON'T READ THIS...
READ THIS!
THE CHALLENGE TO MANAGEMENT OF OFF-THE-JOB ACCIDENTS

AND LEARN HOW YOUR COMPANY
CAN REDUCE OFF-THE-JOB ACCIDENTS . . .
AND THEIR SHOCKING TOLL
OF WASTED LIVES AND DOLLARS.

Until recently, executives have felt there was little they could do to control the rising total of nonwork accidents. But the experience of many companies with the TOTAL SAFETY PLAN developed by the National Safety Council shows that industry can reduce these accidents—by as much as 30%!

Here's proof from one of America's largest companies. They lowered their nonwork accident rate by ⅓ in just five years, using this Total Safety Plan! Even more remarkable, they cut their employee auto fatality rate to 85% below the rate for all U.S. workers! And they shaved another 50% off their already low in-plant accident rate!

YOUR COMPANY CAN ACHIEVE THE SAME KIND OF RESULTS

When you prevent an off-the-job accident you not only help save a life, but you help stop a serious drain on your company's profits. The average nonwork accident costs employers $72. The average company grossing $1 million nets around $73,000. If this company prevents ten nonwork accidents, it can add 1% to net!

The booklet "The Challenge to Management of Off-the-Job Accidents" will show you how to figure your company's nonwork accident rate and costs. It will show you many proved ways in which you can preserve precious lives and profits. Send the coupon for your copy today.

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December 1961

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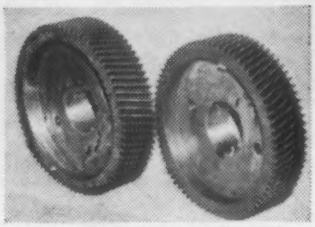

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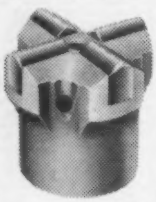

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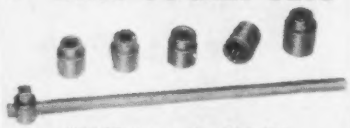

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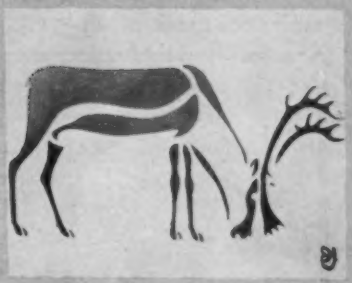

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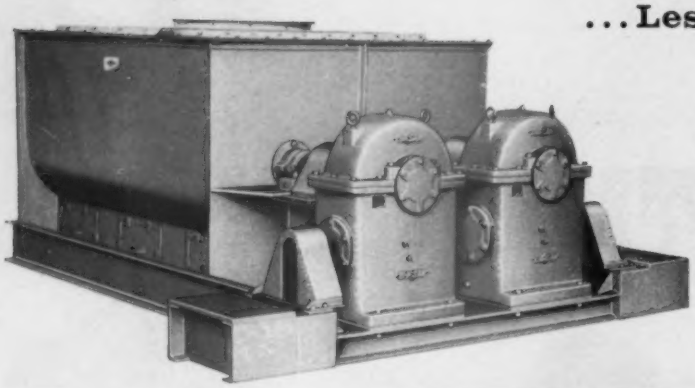

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Precision engineering and construction cut costly, annoying downtime. Steel plate mixing barrels, adjustable stuffing box seals, heavy-duty roller bearing pillow blocks are only a few of the stress points designed to withstand abusive, day-after-day operation.

Combined with a surge hopper, charging hopper with scales, Ehrsam will program an automatic charging, mixing, and discharge operation to your specifications.

20 TO 120 CUBIC-FOOT MODELS AVAILABLE

The J. B. EHRSAM & SONS MFG. COMPANY

Enterprise, Kansas

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EHRSAM **Enterprise, Kansas**

Please send new Ehrsam Mixer Catalog 8A. I am also interested in surge hoppers___; screw conveyors___; Dracon___; belt conveyors___; and bucket elevators___.

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AUTOCAR planetary gear-drive AP-15's in foreground and AP-25's in background have great job stamina. Payload ratings 15 tons and 25 tons, respectively.

Built to haul at sure profit ...that's Autocar

Nothing does the rough-and-ready hauling job like Autocar, because no one else builds like Autocar.

Each Autocar is fully custom-engineered and precision built to do its assigned job with utmost efficiency. Long experience, advanced engineering and flexible manufacture produce just the truck that will earn most for you.

And every Autocar is built to the highest quality standards—beginning with extra-strength frames—including high capacity power trains for maximum top speeds consistent with the job to be done.

Autocar builds a wide range of planetary gear-drive, rear-dump trucks with payload ratings from 12 to 40 tons. They're ahead in maneuverability, strength, safety, comfort, long life—and ability to maintain scheduled trip cycles. Take Autocar, nothing less.

Autocar
"World's Finest"

Division of
The White Motor Company
Exton, Pa.

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Latest score at Lehigh Portland Cement Co. Production: 1,512,000 bbl. Pulverizer maintenance: $0.

Twenty-four hours a day, fourteen months in a row, a B&W pulverizer has been grinding it out for Lehigh Portland Cement Co., Alsen, N. Y.

During this time, the direct-fired 11½ x 400 ft. rotary kiln has produced 1,512,000 barrels of cement. The B&W pulverizer feeding the kiln ground and dried more than 30,000 tons of bitumious coal. In spite of this rugged duty, the pulverizer has required no maintenance.

Maintenance is low because of the wear resisting materials used. The rings are manufactured from B&W's exclusive Elverite C alloy. The balls are heat treated alloy steel.

Grinding elements maintain full contact throughout their lifetime, resulting in maximum fineness and greater production. The B&W pulverizer has helped Lehigh achieve an exceptionally low kiln coal rate.

The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

Babcock & Wilcox

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U.S. SAVINGS BONDS
PAY YOU HIGHER INTEREST
FASTER!

PART OF EVERY AMERICAN'S SAVINGS

BELONGS IN U. S. SAVINGS BONDS

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At Inspiration Consolidated Copper Co.:

No replacements in thirteen years with Anaconda SH-D shovel cable

ALL THE SH-D SHOVEL CABLE ever installed at Inspiration Copper is still in service, including the original order supplied in 1948—a total of over 12,000 feet of SH-D cable without a single "retirement." You can't get replacement costs any lower than that.

Unlike many "shovel cables" that are just ordinary portable power cables hooked up to a shovel, Anaconda SH-D Shovel Cable is specifically designed and built for one particular job. For example:

- The neoprene jacket on SH-D cable is specially compounded in a unique Anaconda process that imparts extra crush resistance, exceptional toughness and abrasion resistance. This same neoprene jacketing material has earned a fine reputation on shuttle-car cable, too.
- SH-D shovel cable is insulated with Anaconda Butyl. Nothing can beat AB Butyl for withstanding ozone, heat and moisture.
- SH-D has Anaconda's specially designed grounding conductors which minimize breaks due to kinks and runovers.

Every design and component of SH-D shovel cable has years of outstanding on-the-job service to back it up. For more information about Anaconda SH-D Shovel Cable, contact Anaconda Wire and Cable Company, 25 Broadway, New York 4, New York, Department EFL-1-PQ.

61298

ASK THE MAN FROM
ANACONDA®
FOR SH-D NEOPRENE-JACKETED SHOVEL CABLE

Aerial view of new South African fluxstone plant shows terminal end of conveyor from the quarry. At right is the Dorr Torq Thickener.

DORR-OLIVER EQUIPMENT

plays major role in new 1,500,000-ton South African fluxstone plant

Built to take advantage of extensive local dolomite deposits, a new South African plant at Mooiplaas, near Pretoria, can produce 1½-million tons of high fluxing magnesia limestone for refractories and other uses. This output will make South Africa independent of outside sources for many years to come, and will contribute to the development of the country's expanding steel and other industries.

Equipment at the highly mechanized plant includes an 8′ x 30′ Dorr Classifier, a 100′-dia. Dorr Torq Thickener, and a Dorrco 6W pump.

This new installation in South Africa is another indication of the world-wide acceptance of Dorr-Oliver equipment. Dorr-Oliver has a reputation for dependable performance in a wide range of applications throughout the rock products industry.

The services of Dorr-Oliver's Plant Engineering Division are always at your disposal to aid in dealing with special problems. For further information, contact Dorr-Oliver Incorporated.

Dorr, Dorrco, Torq—TM. Reg. U.S. Pat. Off.

DORR-OLIVER

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

See Chemical Engineering Catalog or write for Bradley Catalog No. 63

There's a Bradley Mill to do your job in semi-fine and fine grinding . . .

For finished products of 8, 10 or 20 mesh containing a high percentage of 60, 100 and 200 mesh material, without additional screening, the Bradley Screen Type Hercules Mill is unsurpassed.

For finished products of all through a 20 mesh upwards to 99.5% passing a 325 mesh, the Bradley Pneumatic Hercules Mill offers a complete range of sizes to fit almost any requirement. Flash Drying in the Mill System is available where required.

All Bradley Mills are ruggedly built, dustless in operation and easily maintained. Every effort is made to keep maintenance costs to a minimum.

Bradley will *test-grind your material at no cost*, then recommend the *complete* mill system to do a better job on *your* job.

Superior Grinding Equipment Since 1891

BRADLEY

LONDON • **ALLENTOWN, PA.** • BOSTON **PULVERIZER COMPANY**

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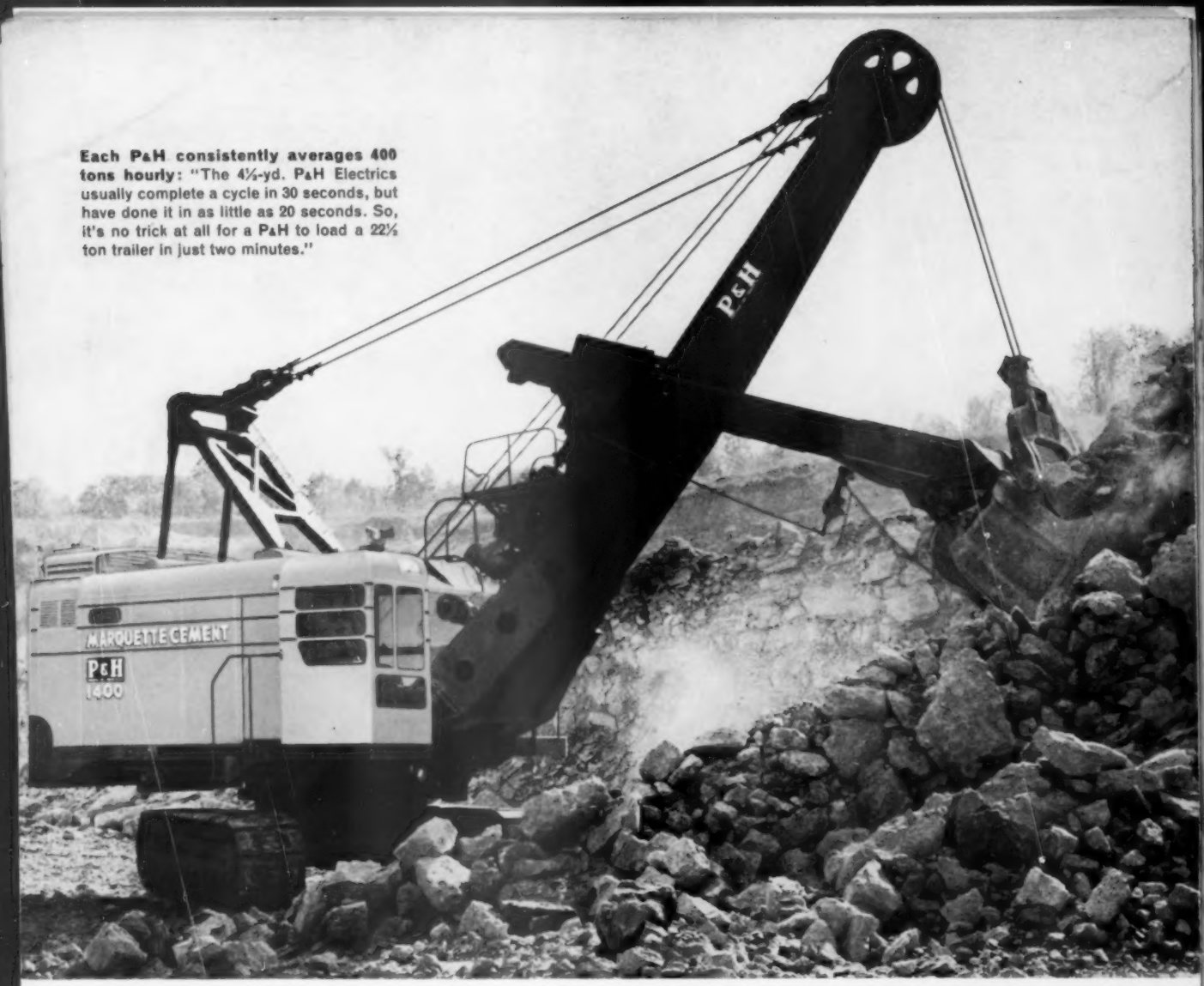

Each P&H consistently averages 400 tons hourly: "The 4½-yd. P&H Electrics usually complete a cycle in 30 seconds, but have done it in as little as 20 seconds. So, it's no trick at all for a P&H to load a 22½ ton trailer in just two minutes."

For Marquette Cement Mfg. Co., three P&H Electrics rack up 6 yr. record of...

98% overall availability...100% dependability of P&H electronic controls

Three P&H Electrics—equipped with Magnetorque hoist drive—are working 16 hours daily, 5 days a week to load the major share of 1½ million tons of limestone and shale quarried annually at Marquette's Oglesby, Ill., quarry.

According to Plant Superintendent, Ralph Moyle, "The 4½-yard Model 1400 P&H shovels have an amazing record of 98% availability. And, with a total of six years' time on the three shovels, we haven't had a single problem or parts replacement with the P&H Electronic Controls."

Magnetorque Hoist Drive lowers per ton loading cost: "Our P&H Electrics have a great deal more bail pull than other machines and give us greater dipper fill factor," says Moyle. "The reason for this is Magnetorque drive. It transmits power from an AC hoist motor direct to the dipper...adjusts digging torque automatically so that we get uniform dipper speed in the bank and a relatively vertical bail pull —bail speed curve. The result is really what we like: more work-producing horse power at the dipper lip which fills the dippers fuller, faster."

For details on how Marquette Cement Company achieved this dependably high output, write for Case History Report No. 148, to the World's largest builder of Full Electric Shovels.

HARNISCHFEGER P&H
CONSTRUCTION & MINING DIVISION
Milwaukee 46, Wisconsin

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